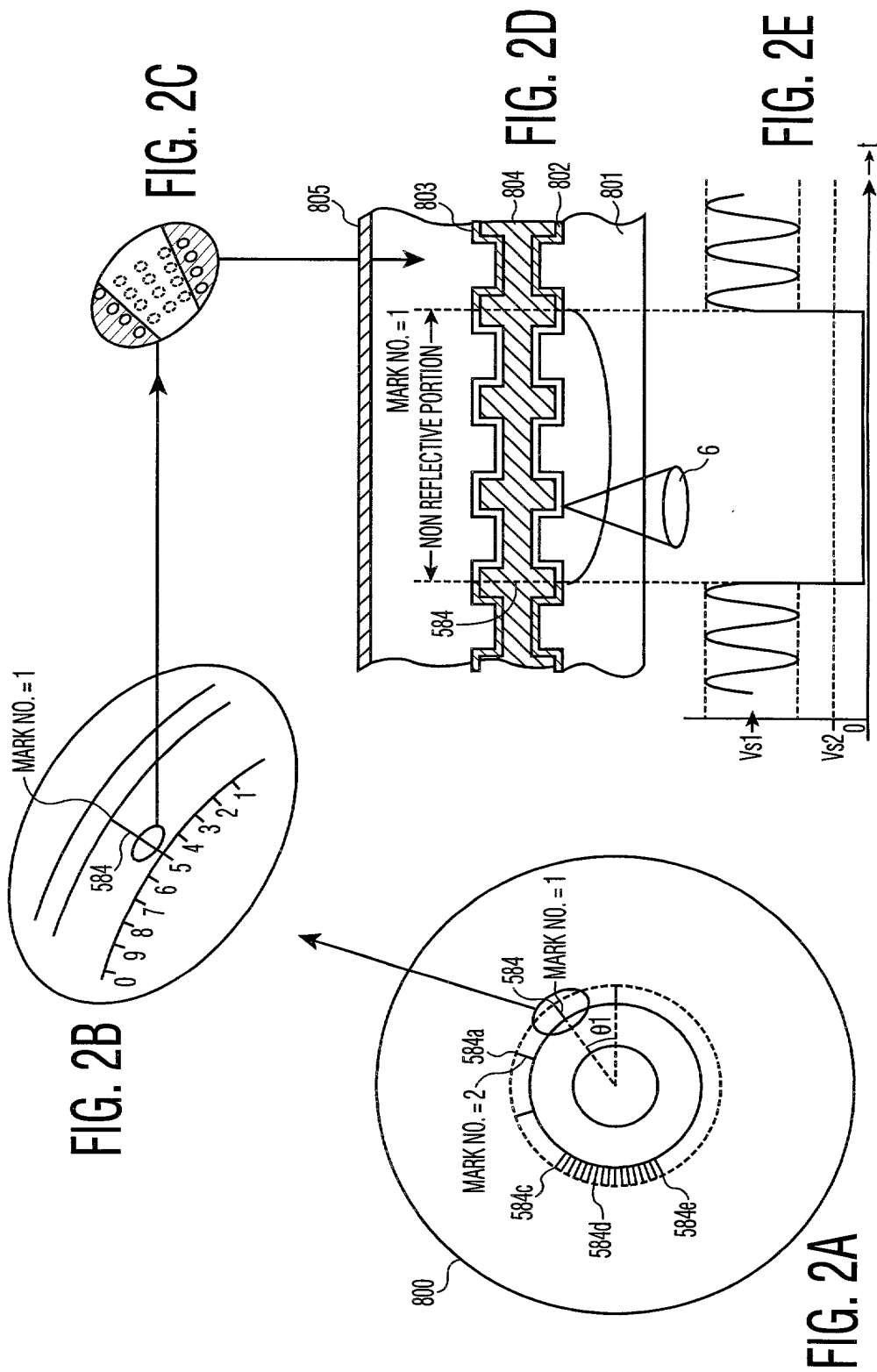


FIG. 1



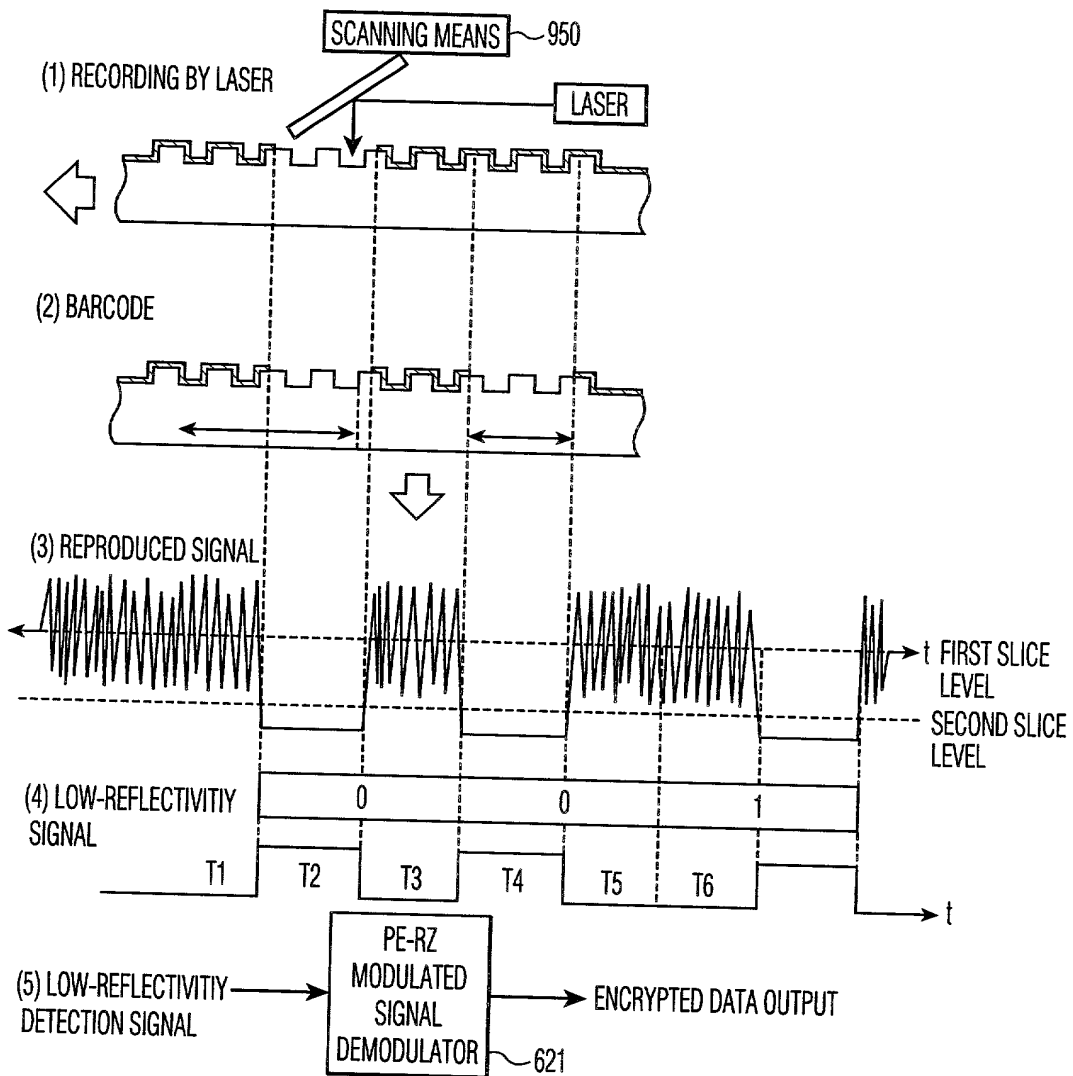
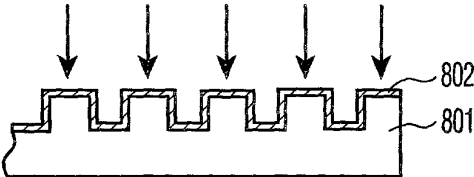


FIG. 3

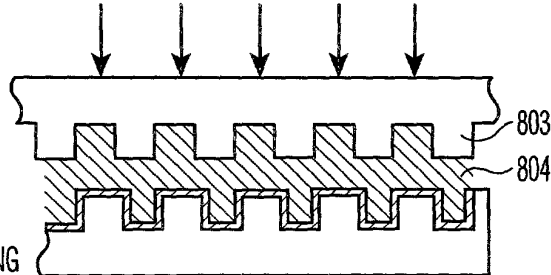
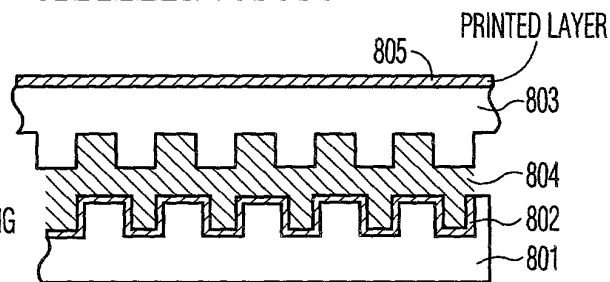
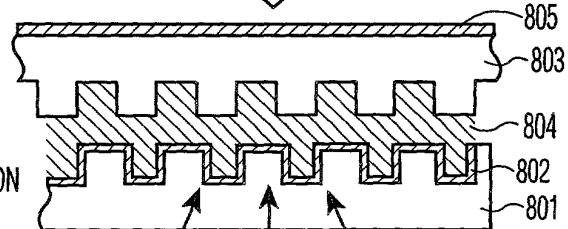
FIRST DISK FABRICATION PROCESS

STEP (1)
FORMING

SPUTTERING

STEP (2)
REFLECTIVE
FILM FORMATION

ULTRAVIOLET RADIATION

STEP (3)
LAMINATION
AND HARDENINGSTEP (4)
LABEL PRINTINGSECONDARY
RECORDING
PROCESSSTEP (5)
FORMATION
OF FIRST
OPTICAL
MARK

PULSED LASER 813



FIG. 4

FIG. 5

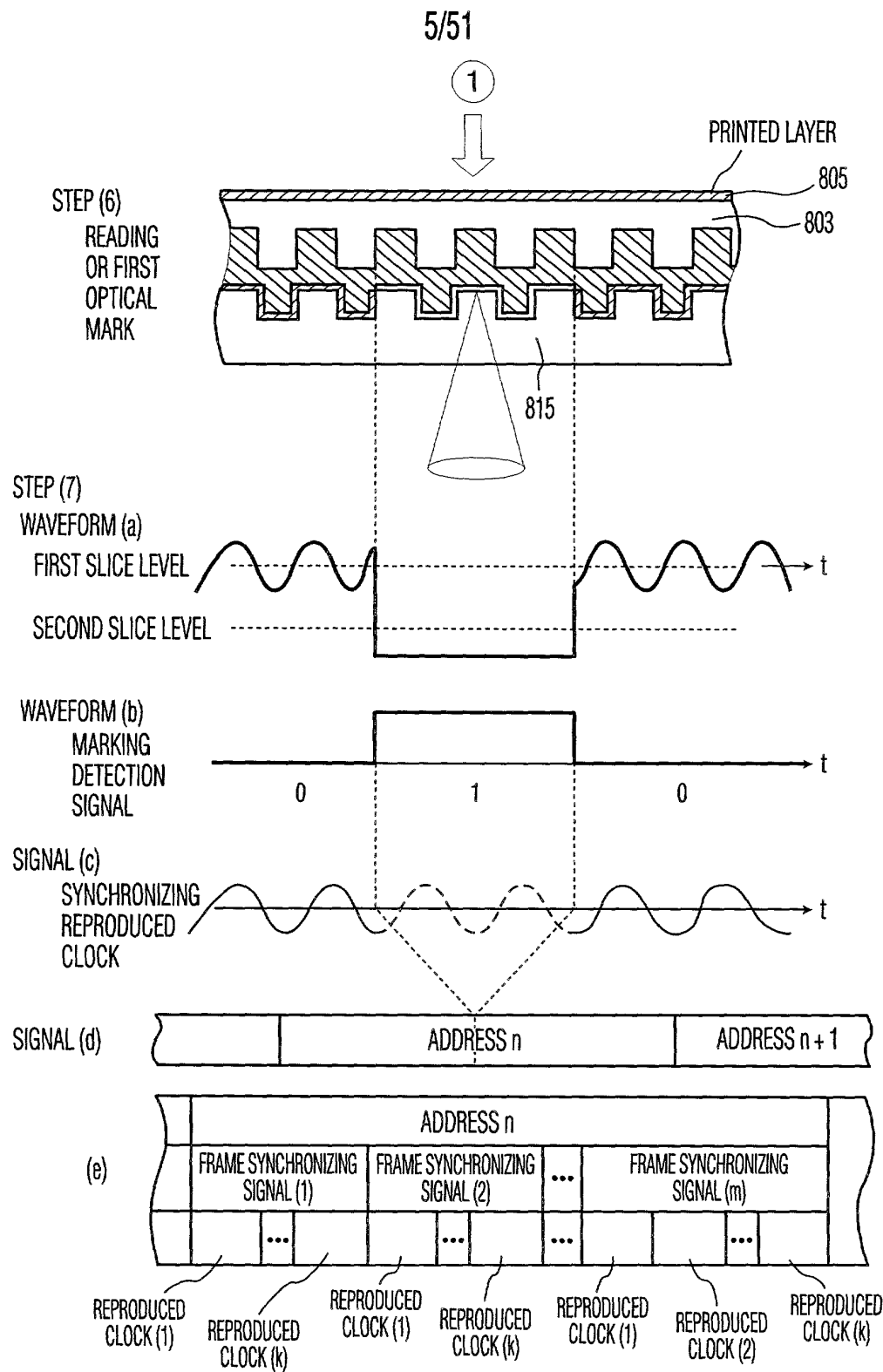


FIG. 5

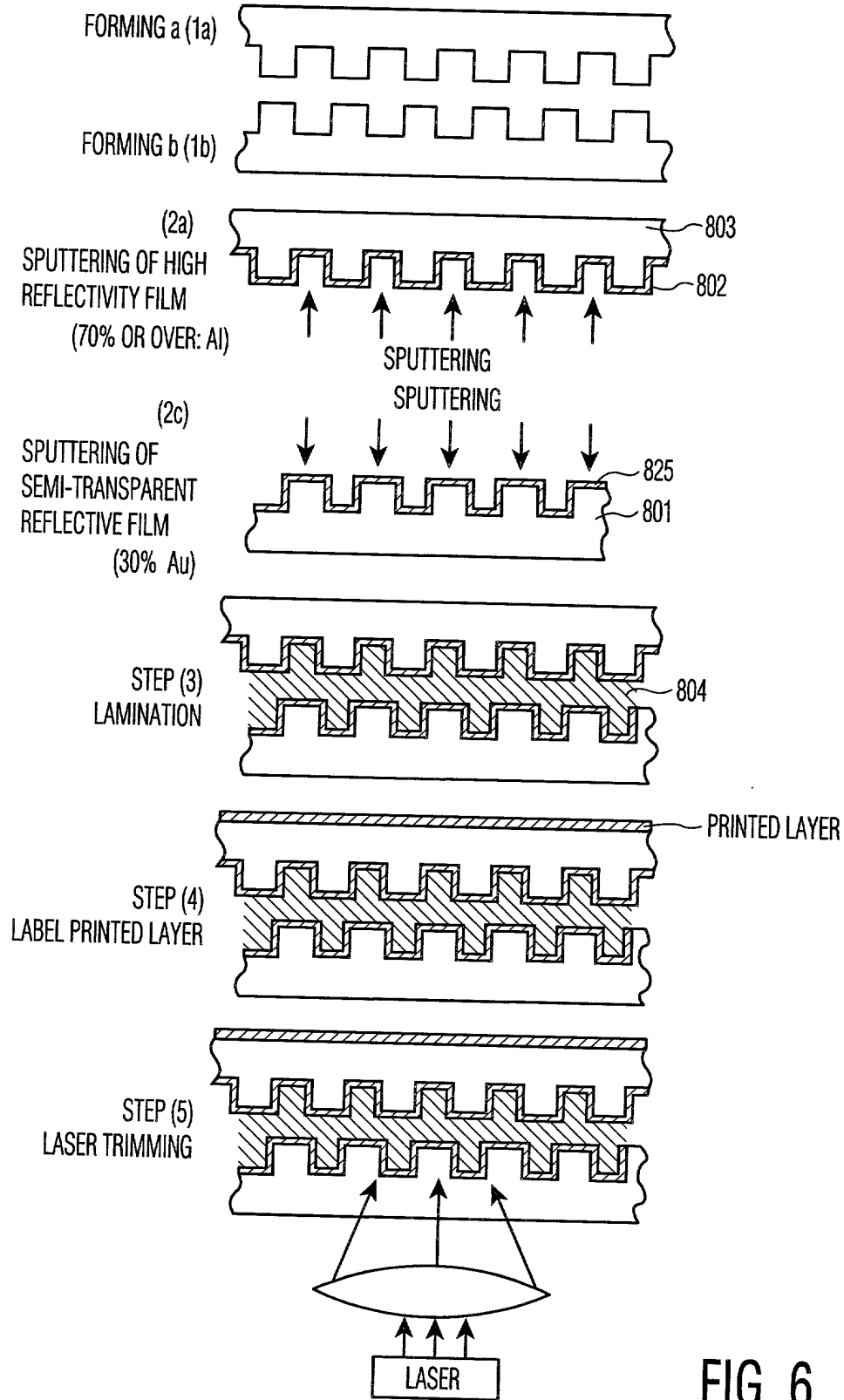
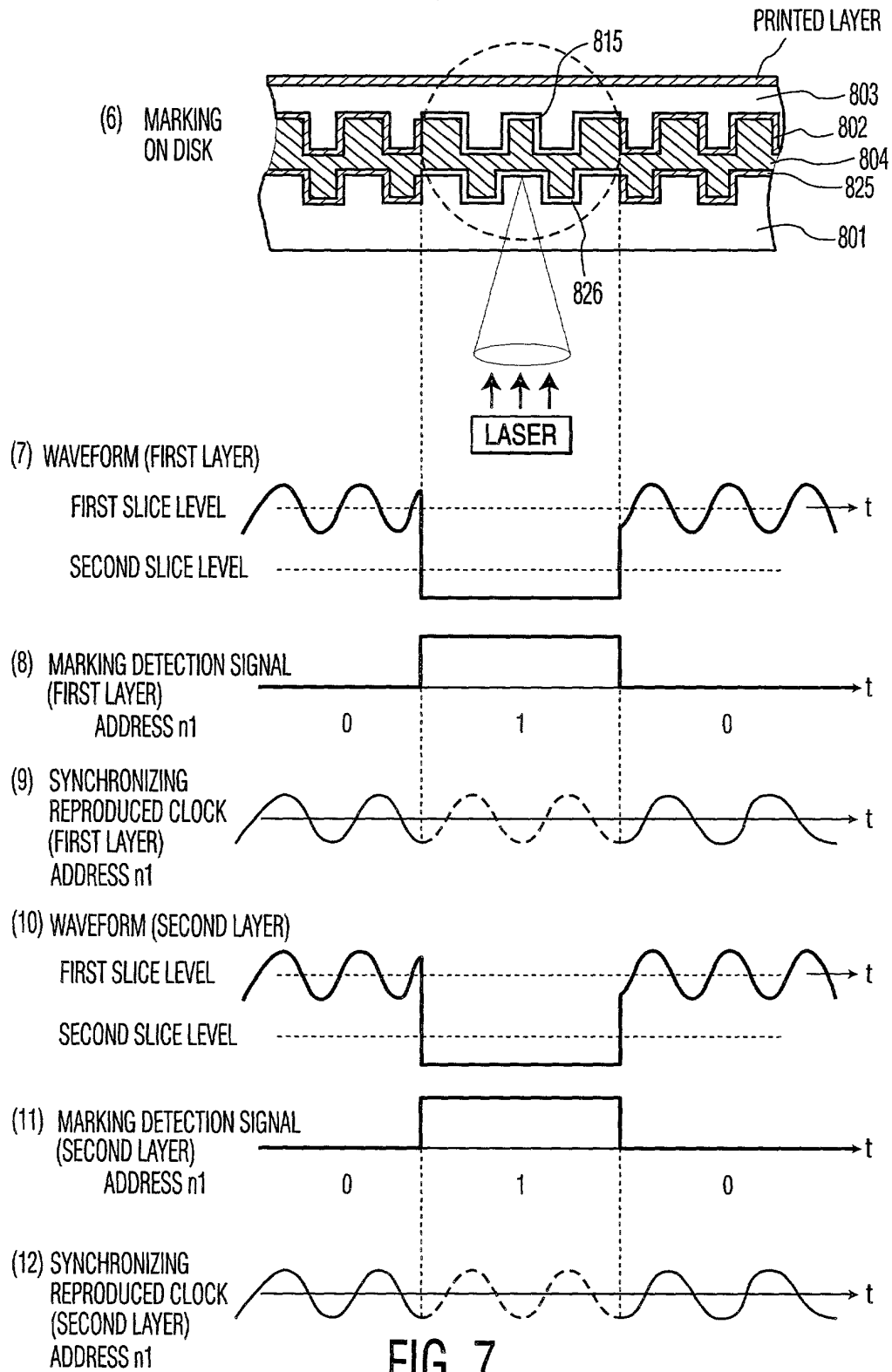


FIG. 6

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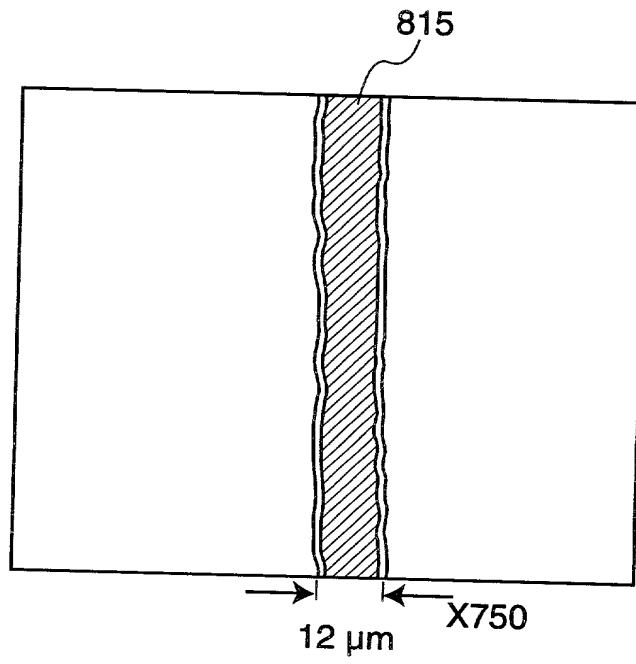


FIG. 8A

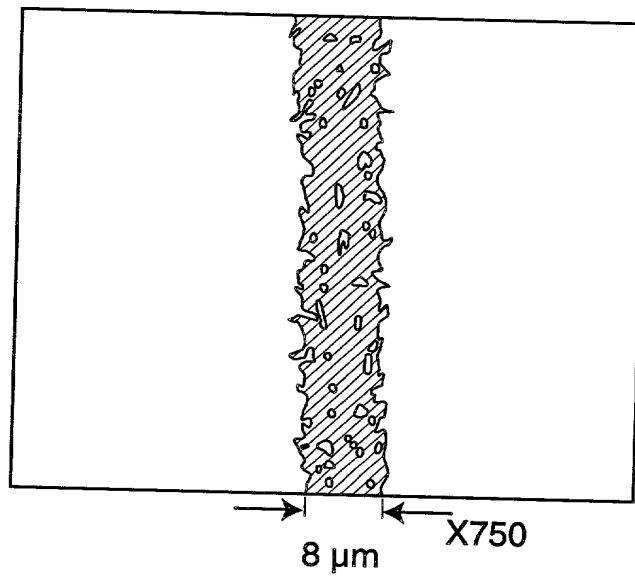


FIG. 8B

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FIG. 9A

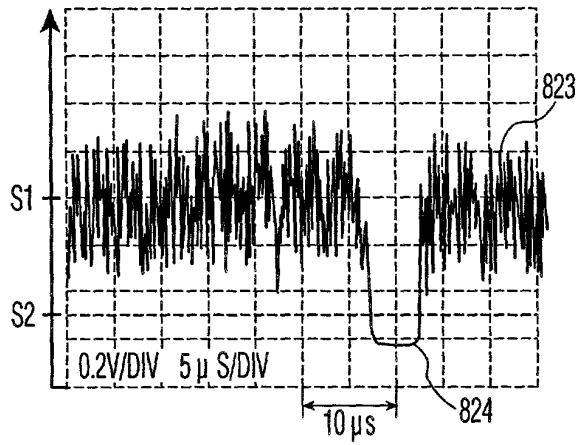


FIG. 9B

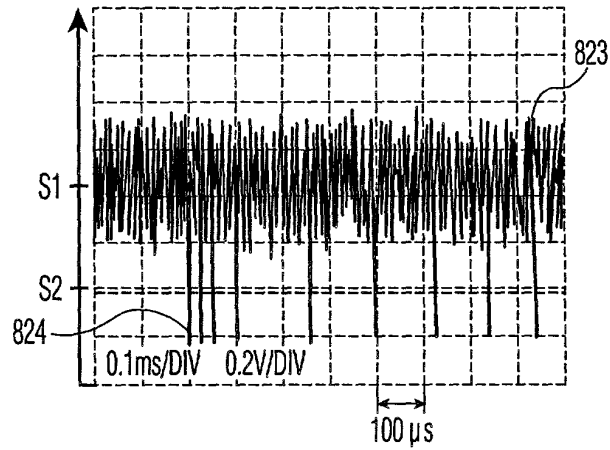


FIG. 9C

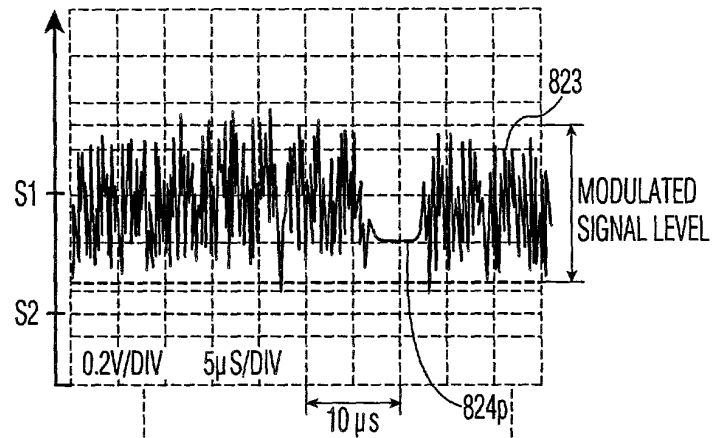
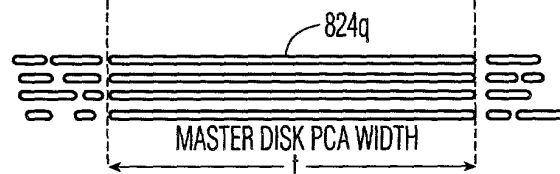


FIG. 9D



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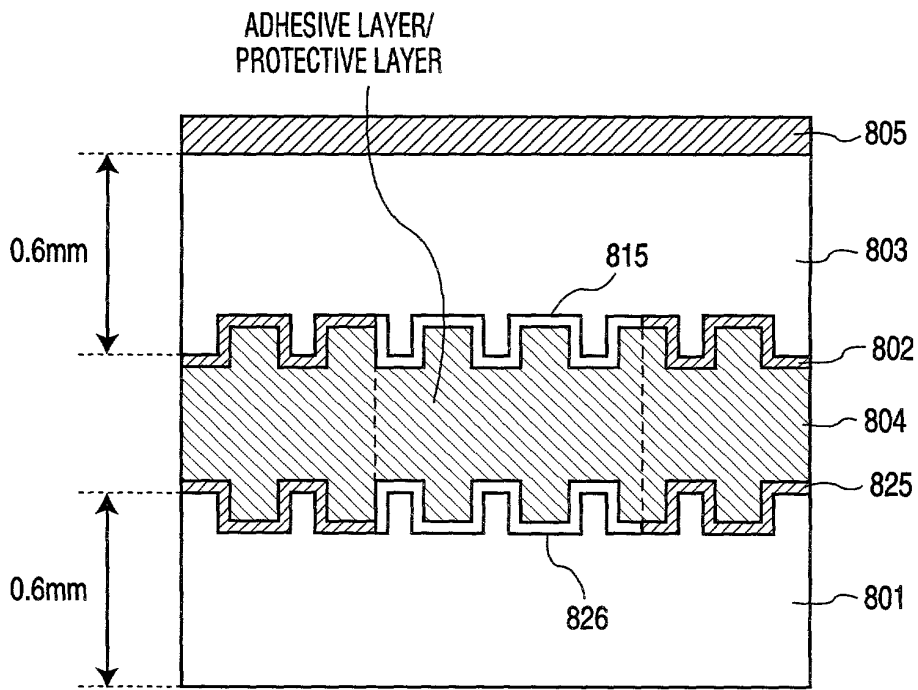


FIG. 10A

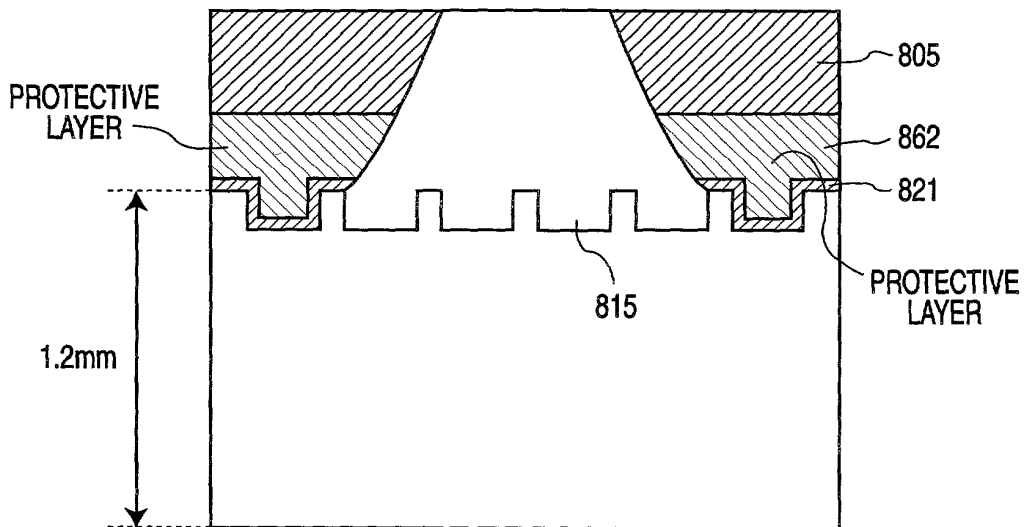


FIG. 10B

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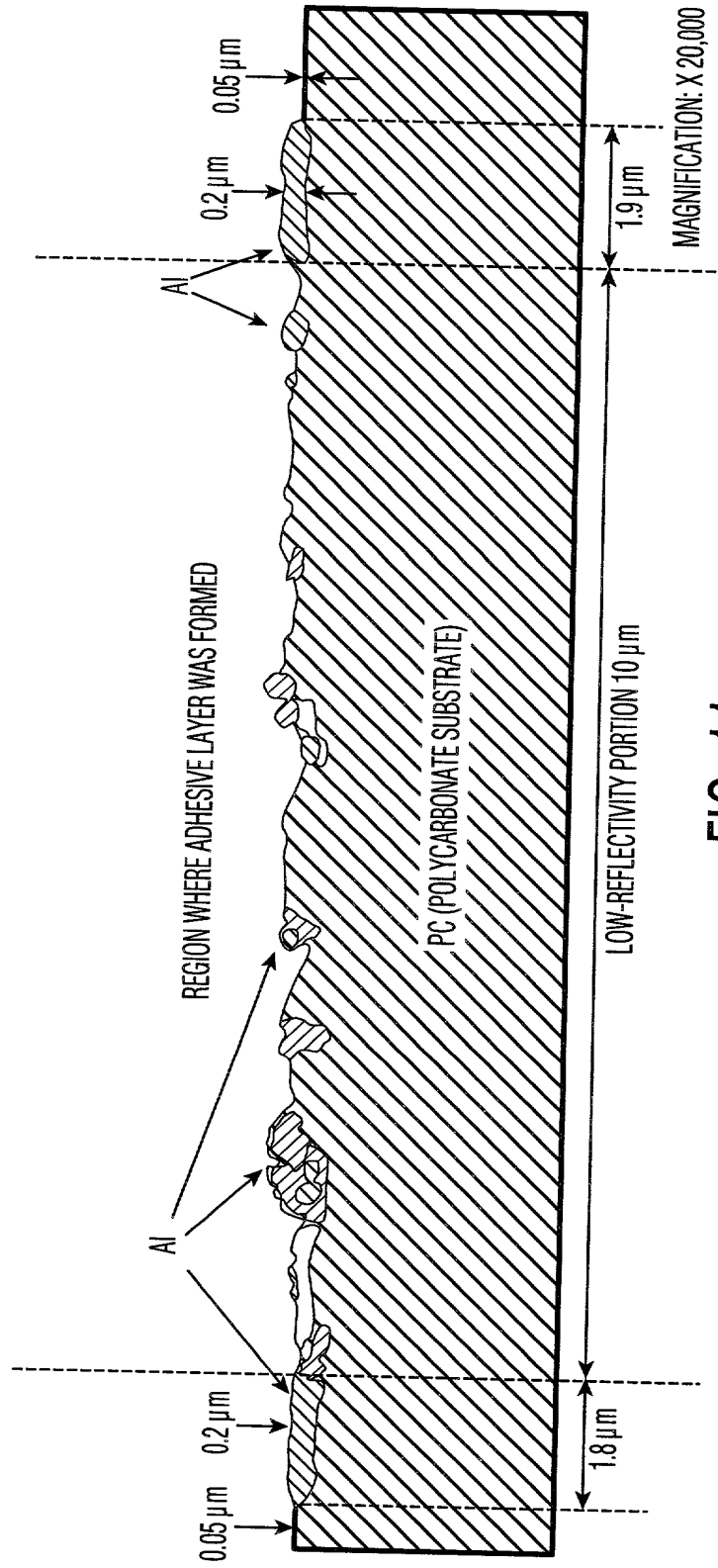


FIG. 11

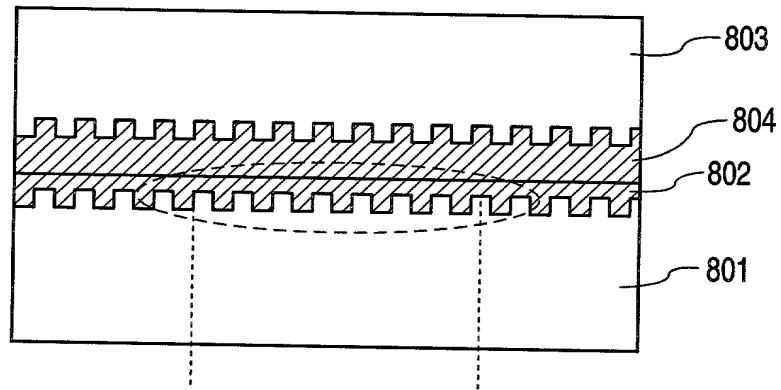


FIG. 12A

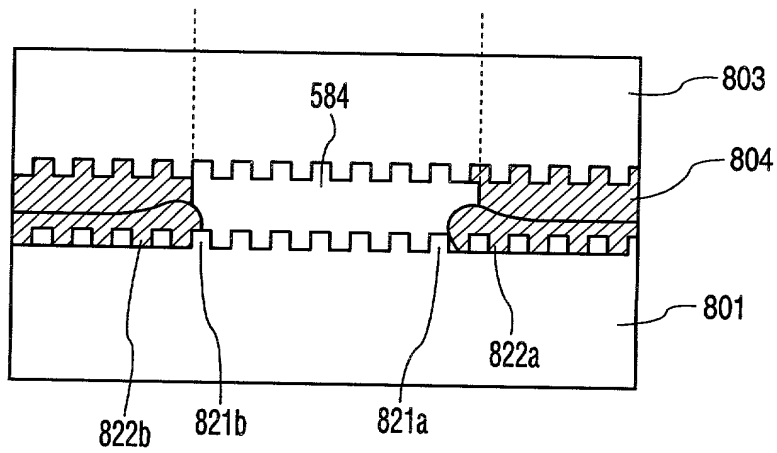


FIG. 12B

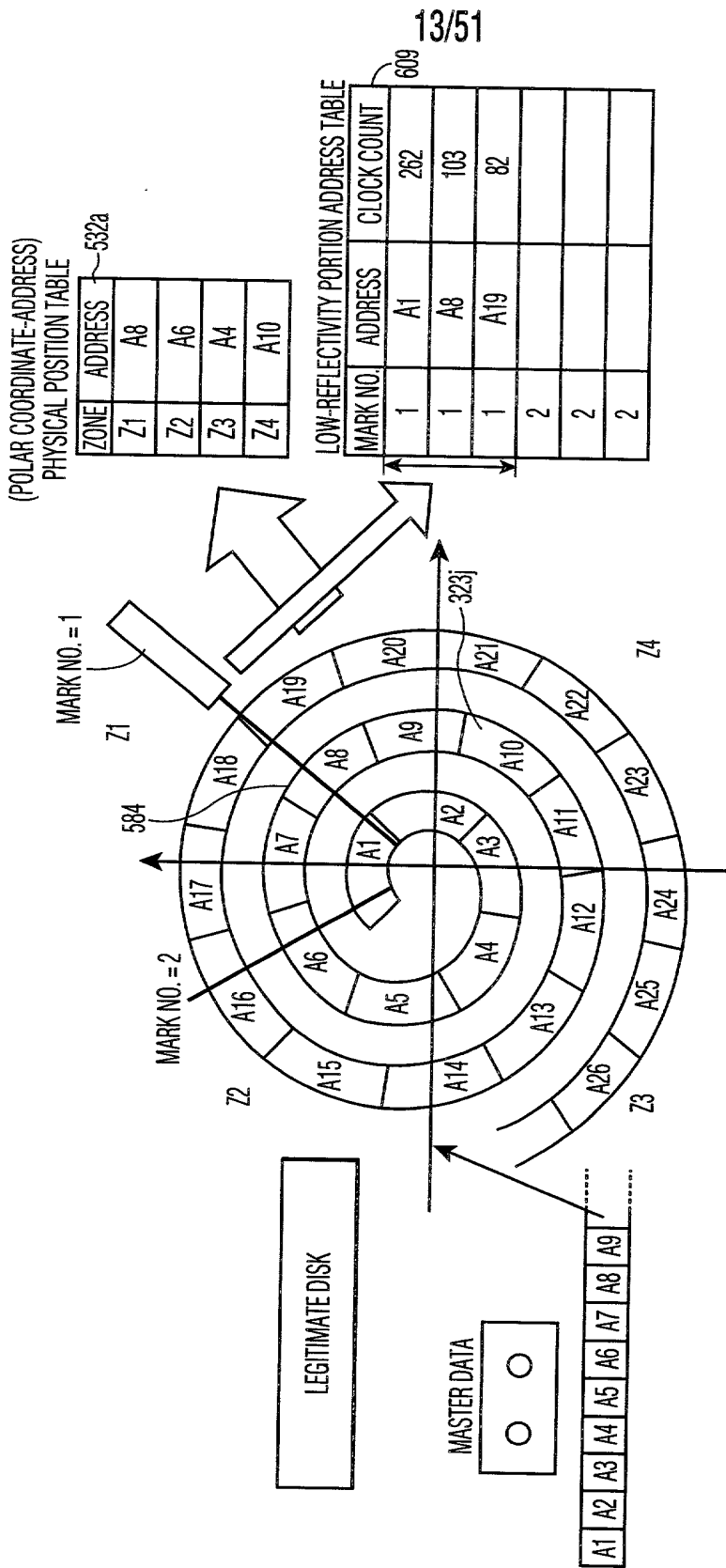
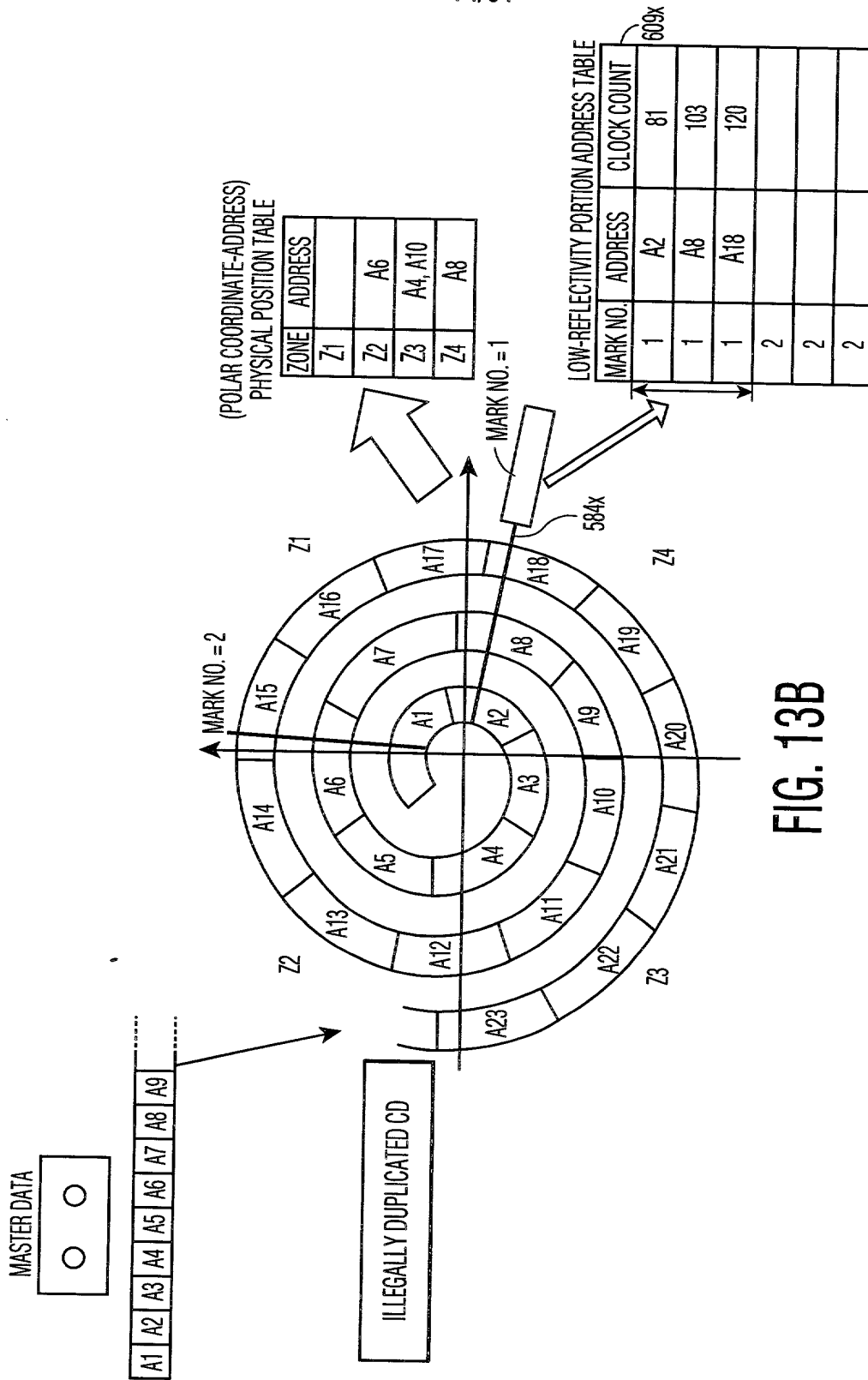


FIG. 13A



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FIG. 14A
FIG. 14B

FIG. 14C
FIG. 14D

FIG. 14

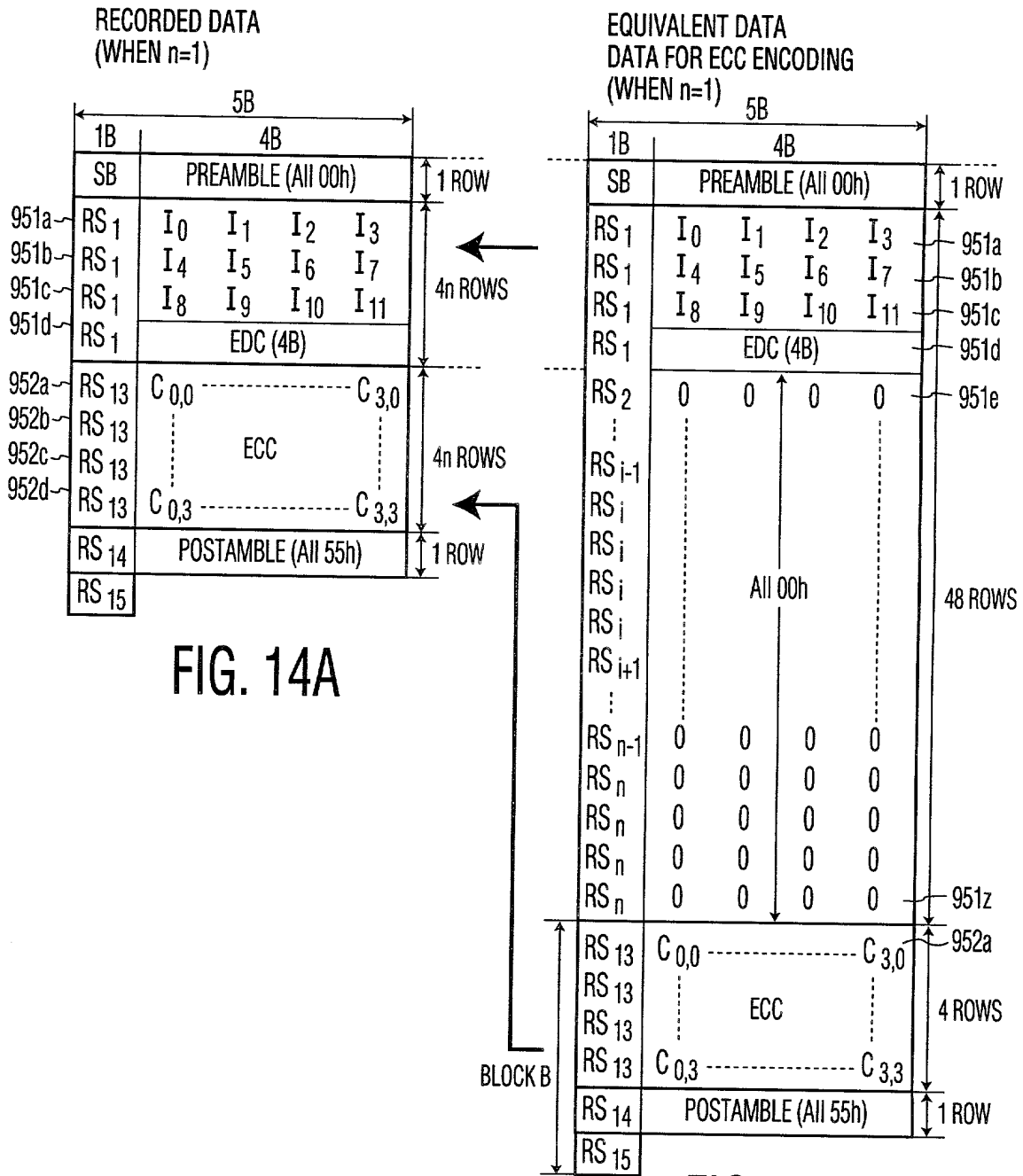


FIG. 14A

FIG. 14B

TYPICAL EQUATION
FOR EDC COMPUTATION
EDC (ERROR DETECTION CODE) :

$$EDC_{PCA}(x) = \sum_{i=0}^{31} b_i \cdot x^i$$

$$I_{PCA}(x) = \sum_{i=32}^{128n-31} b_i \cdot x^i$$

FIG. 14C

TYPICAL EQUATION
FOR EDC COMPUTATION
ECC (ERROR CORRECTION CODE) :

$$R_{PCA}(x) = \sum_{i=48}^{51} I_{j+4i} \cdot x^{51-i}$$

$$I_{PCA}(x) = \sum_{i=0}^{4n-2} I_{j+4i} \cdot x^{51-i} + D_j \cdot x^{52-4n},$$

FIG. 14D

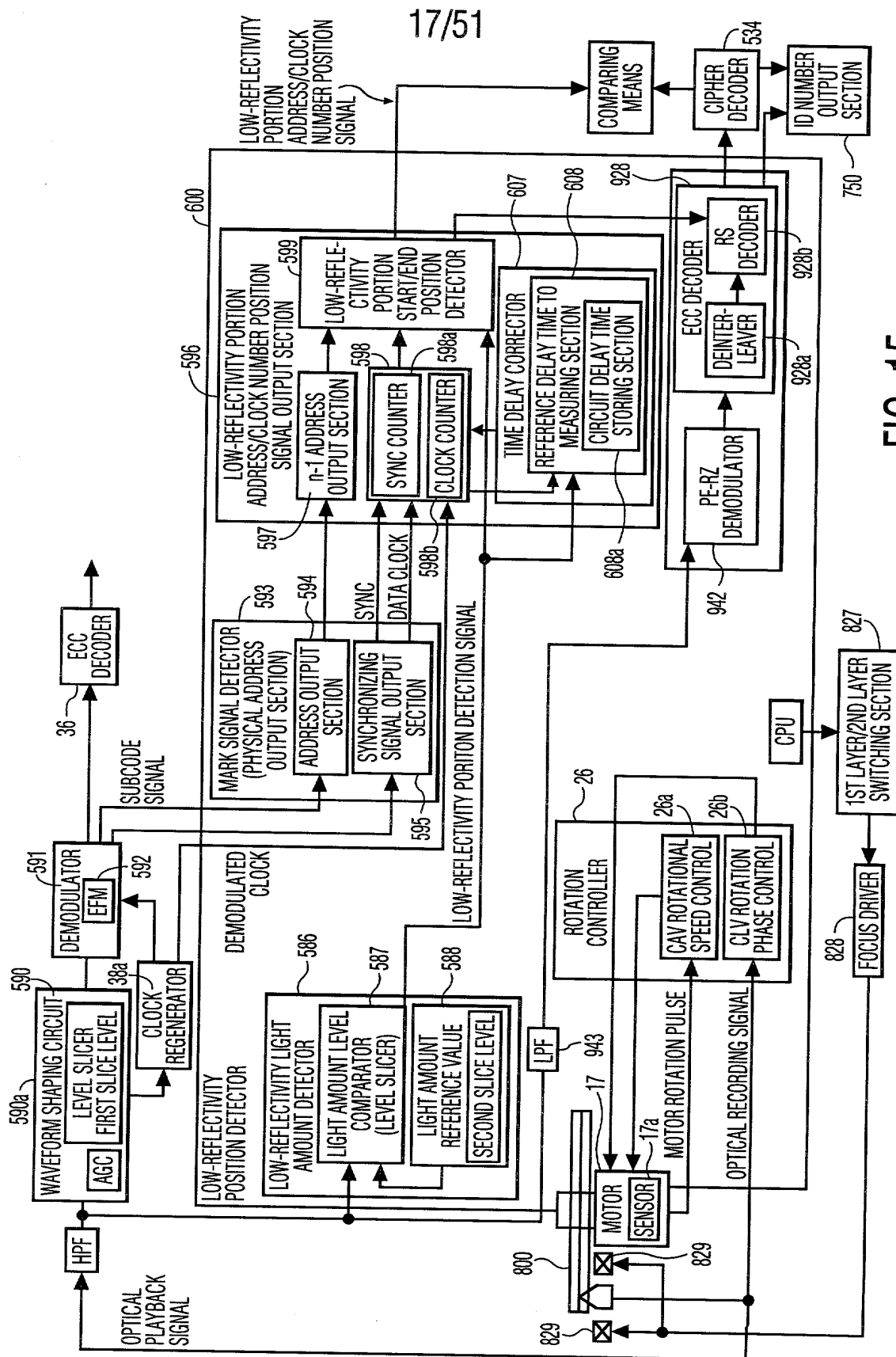


FIG. 15

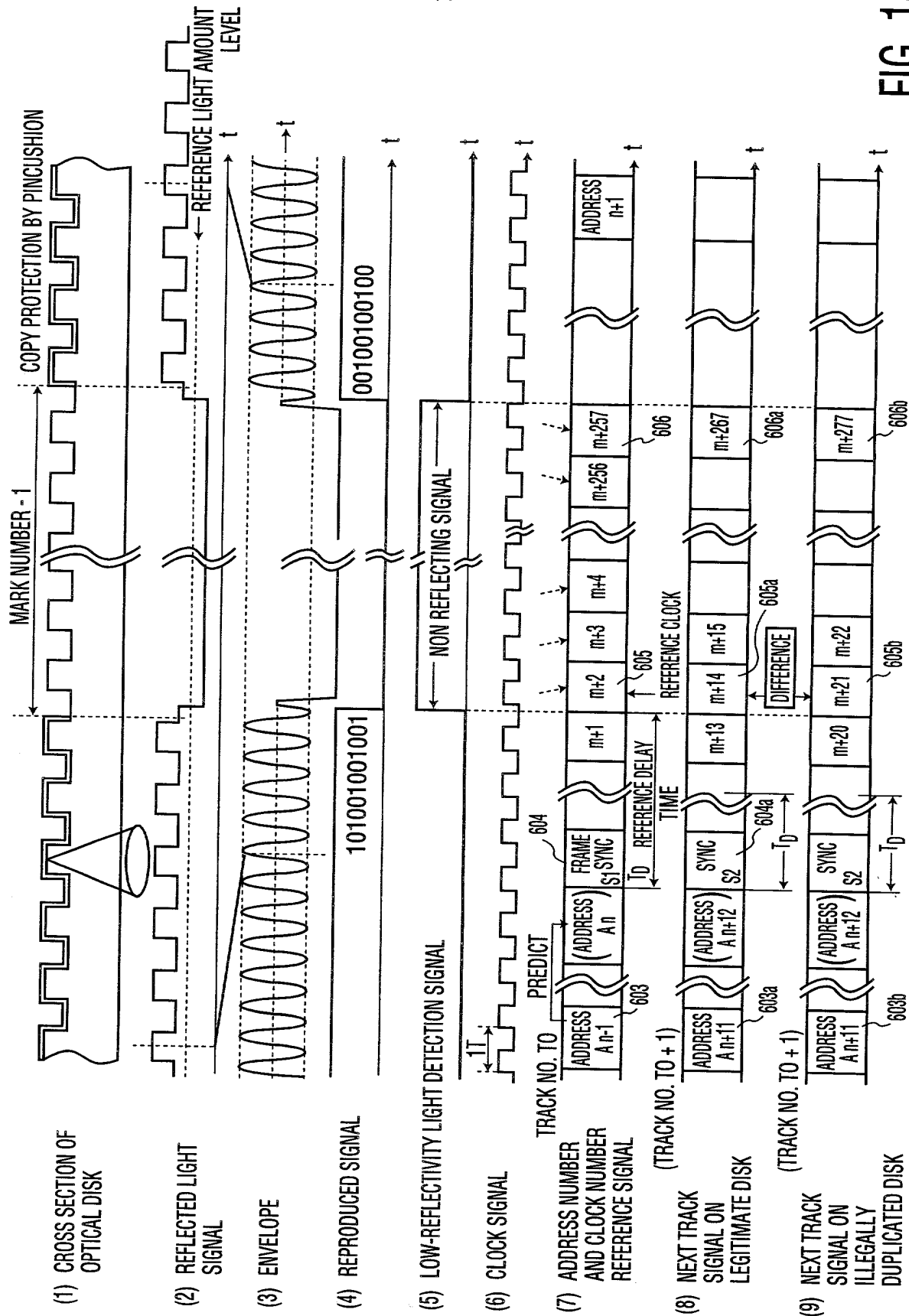


FIG. 16

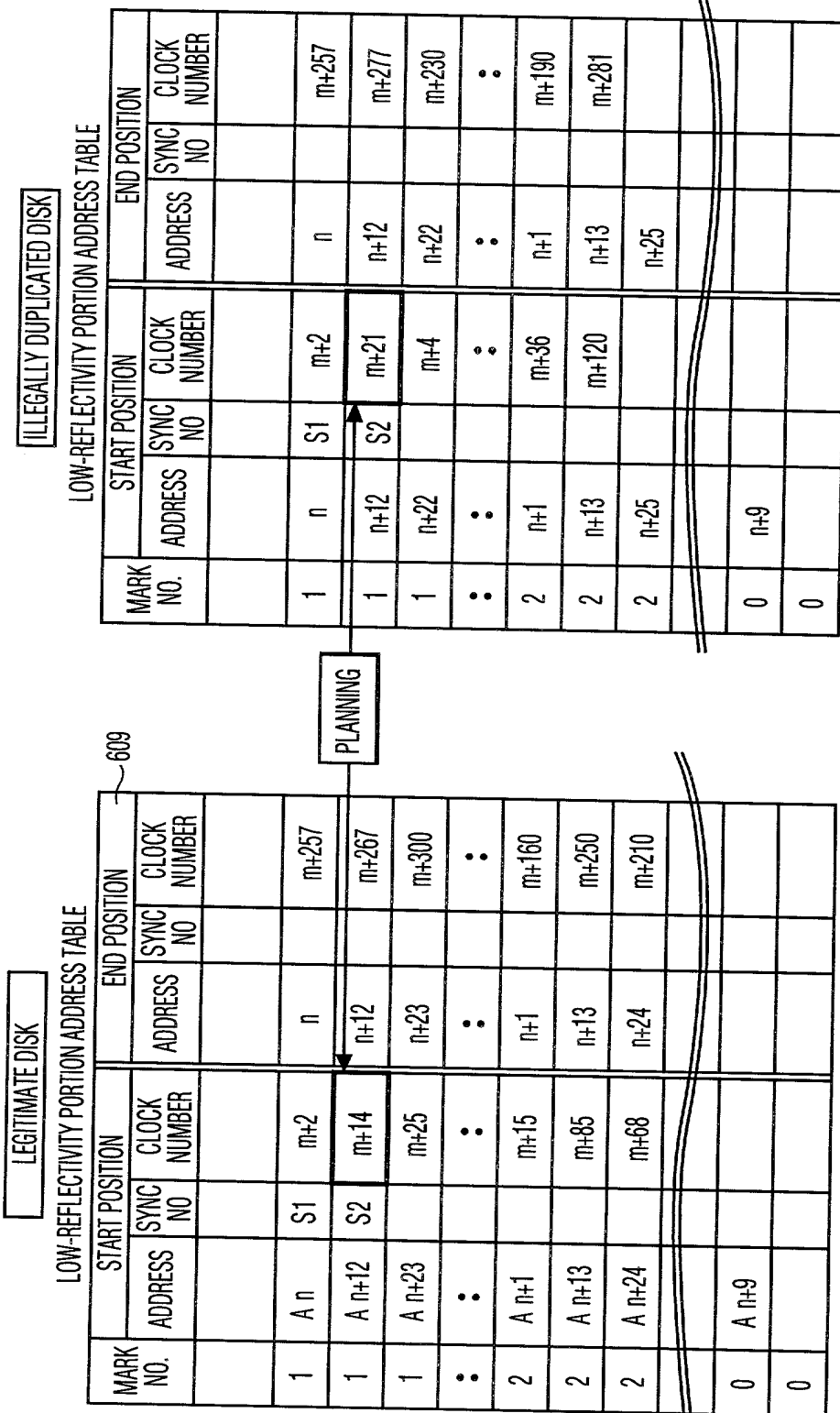


FIG. 17

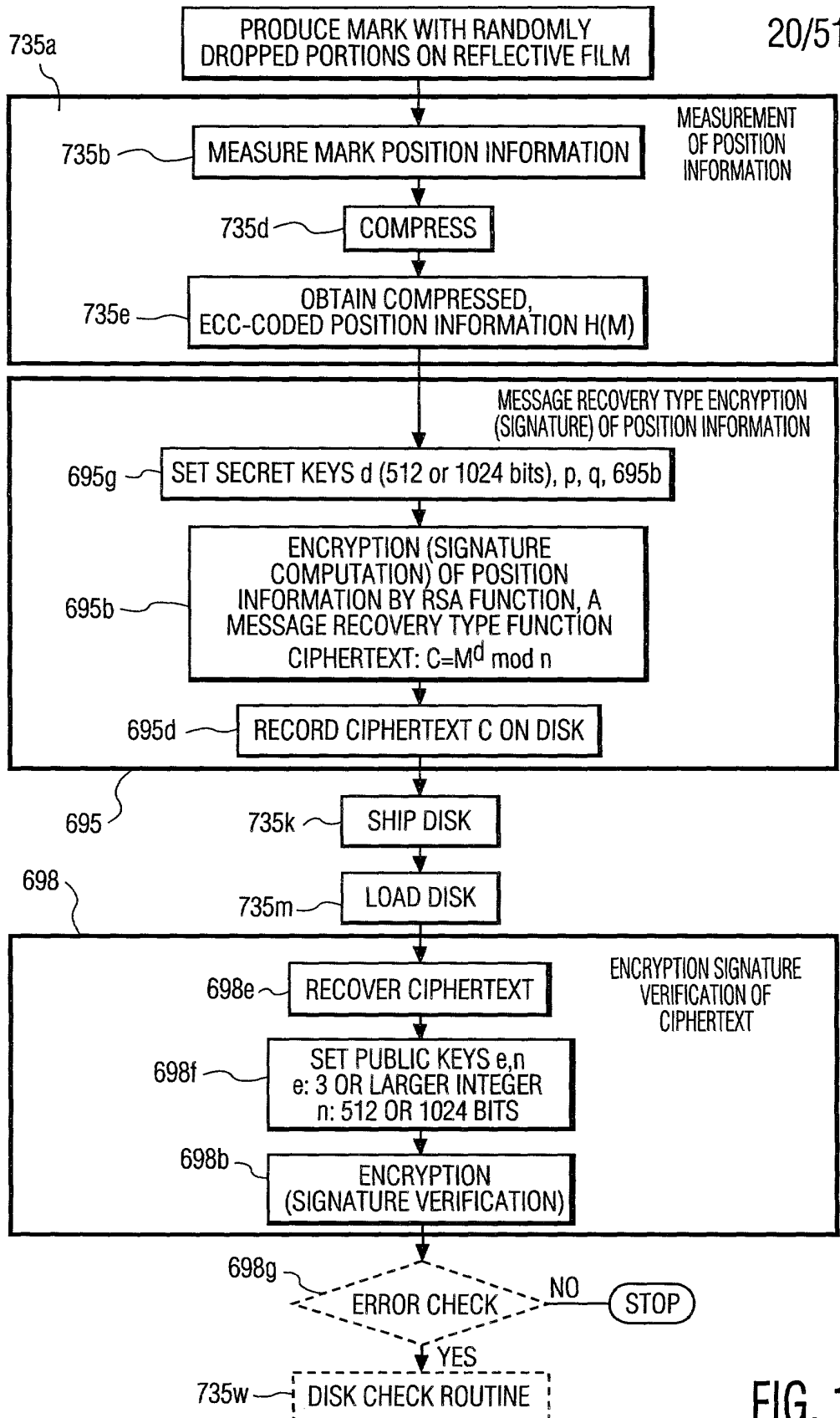


FIG. 18A

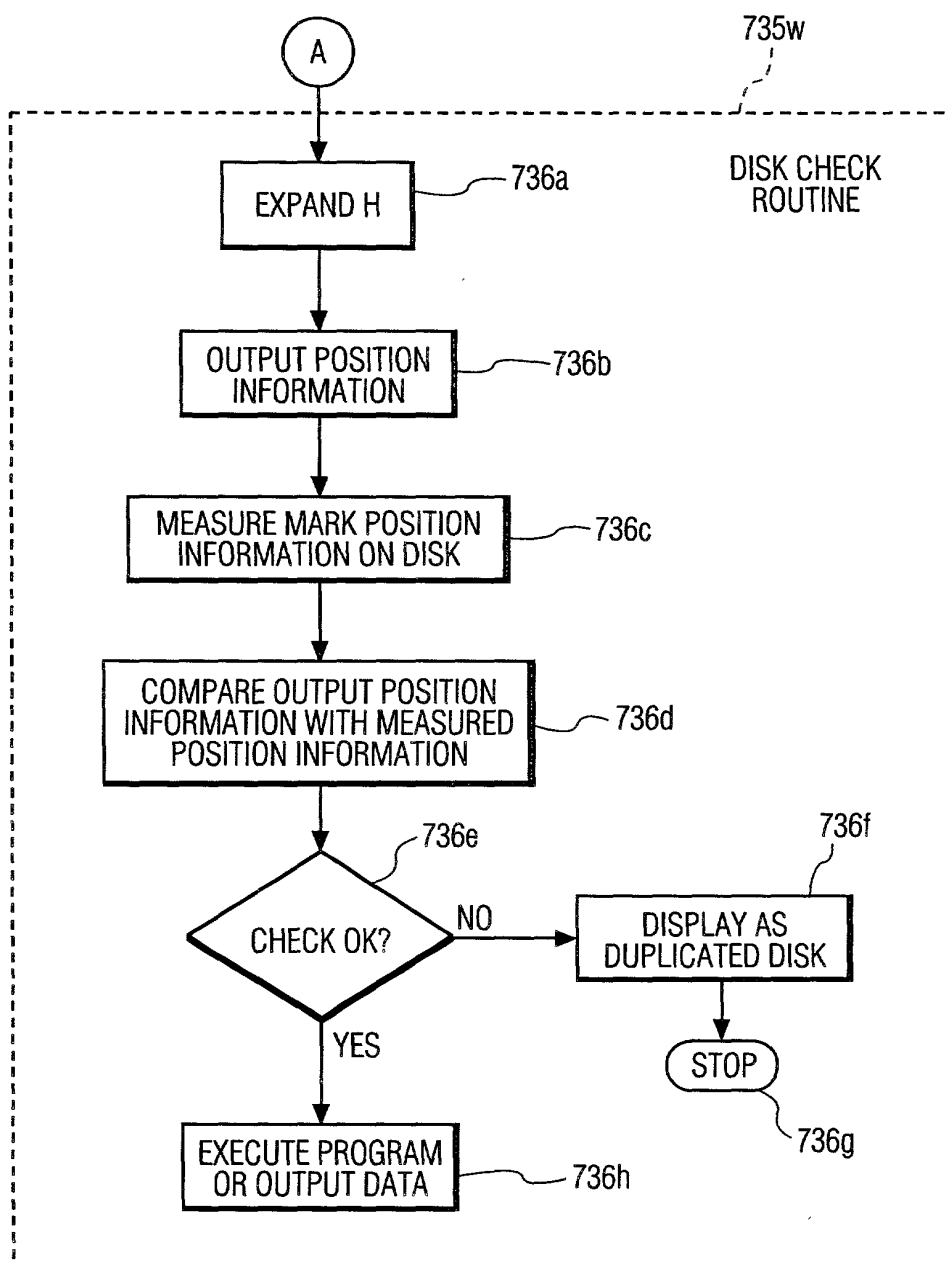


FIG. 18B

PROGRAM IN REPRODUCTION APPARATUS FOR DETECTING
OPTICAL MARK WITH INCREASED ACCURACY OR STABILITY

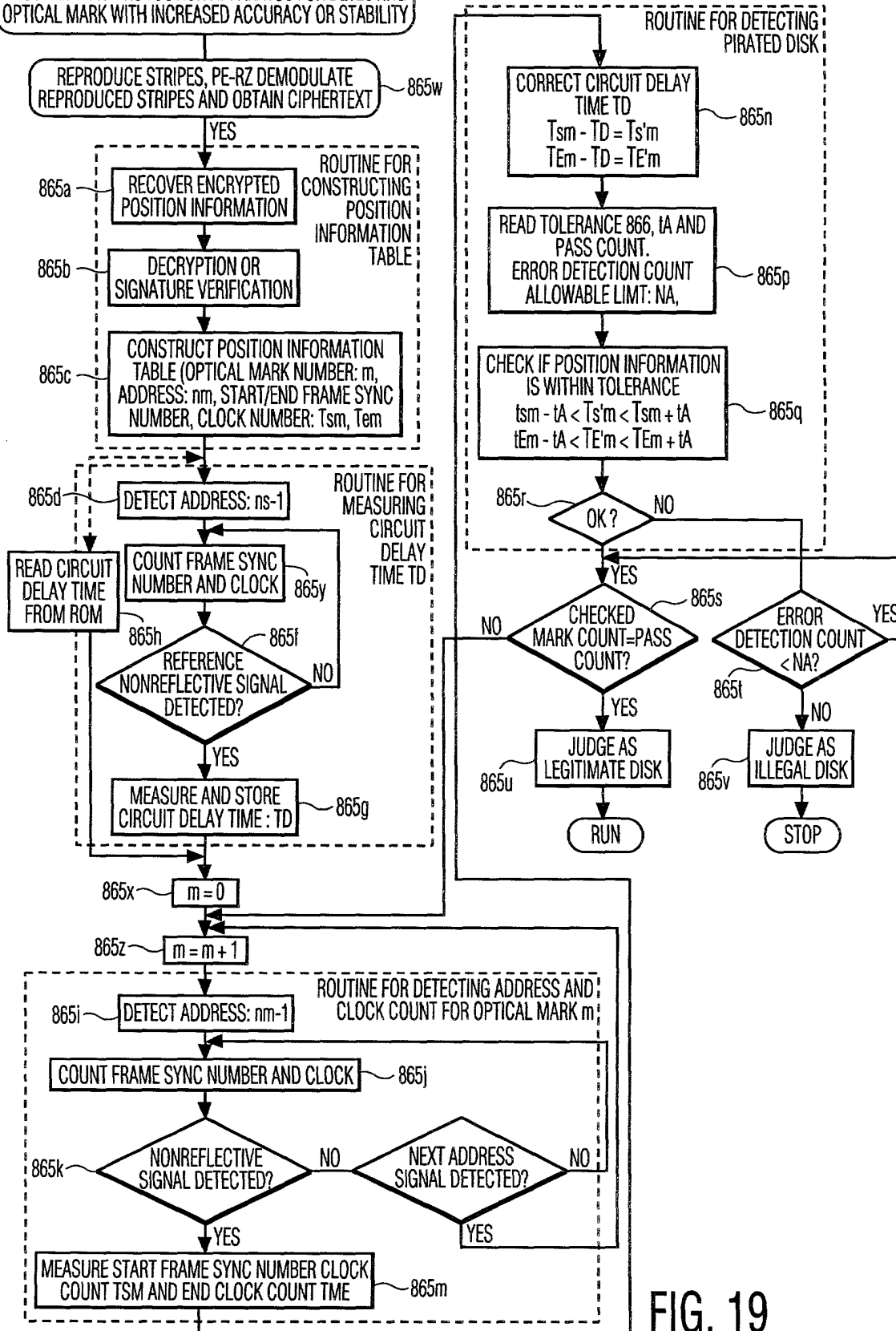


FIG. 19

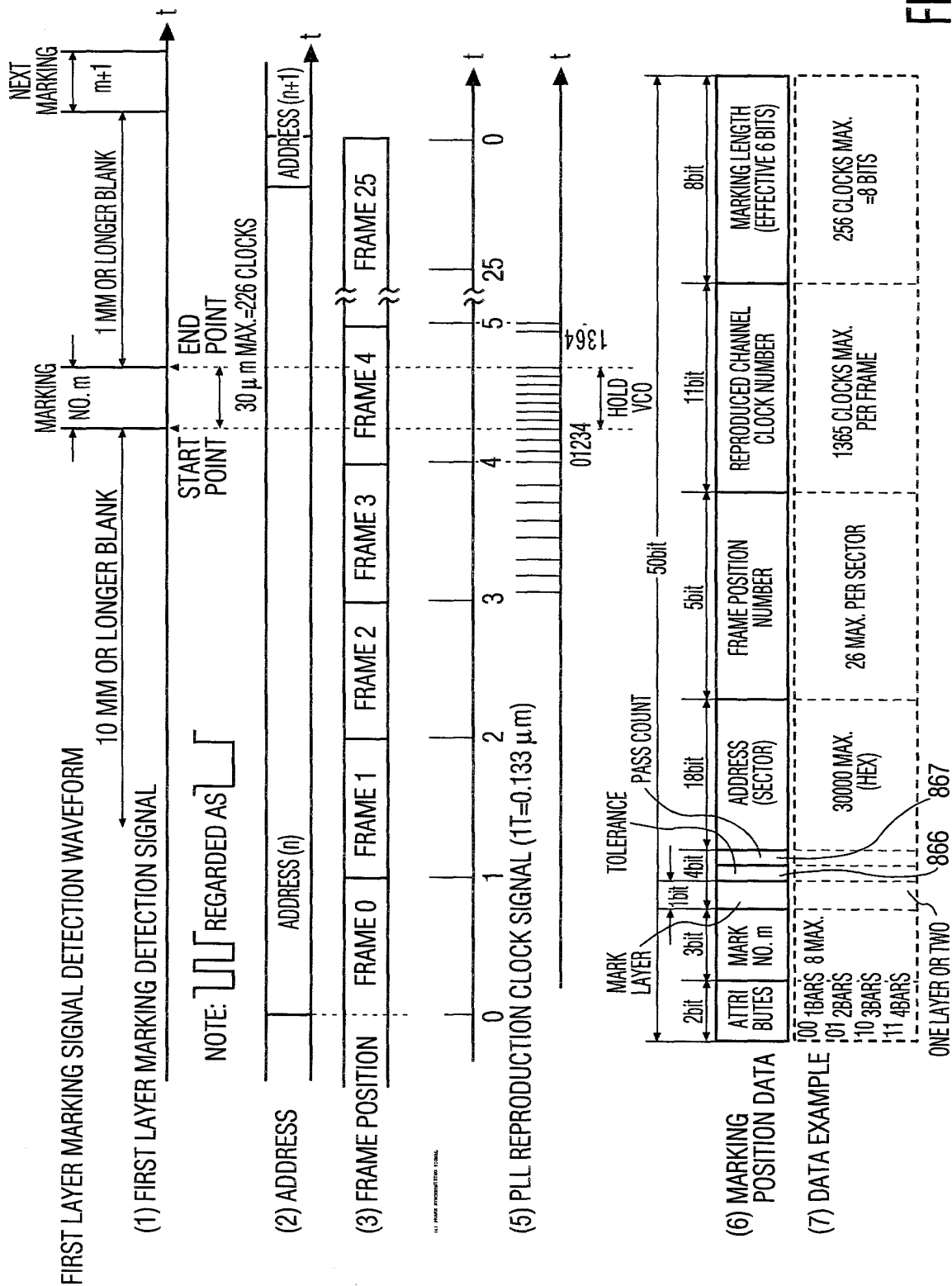


FIG. 20

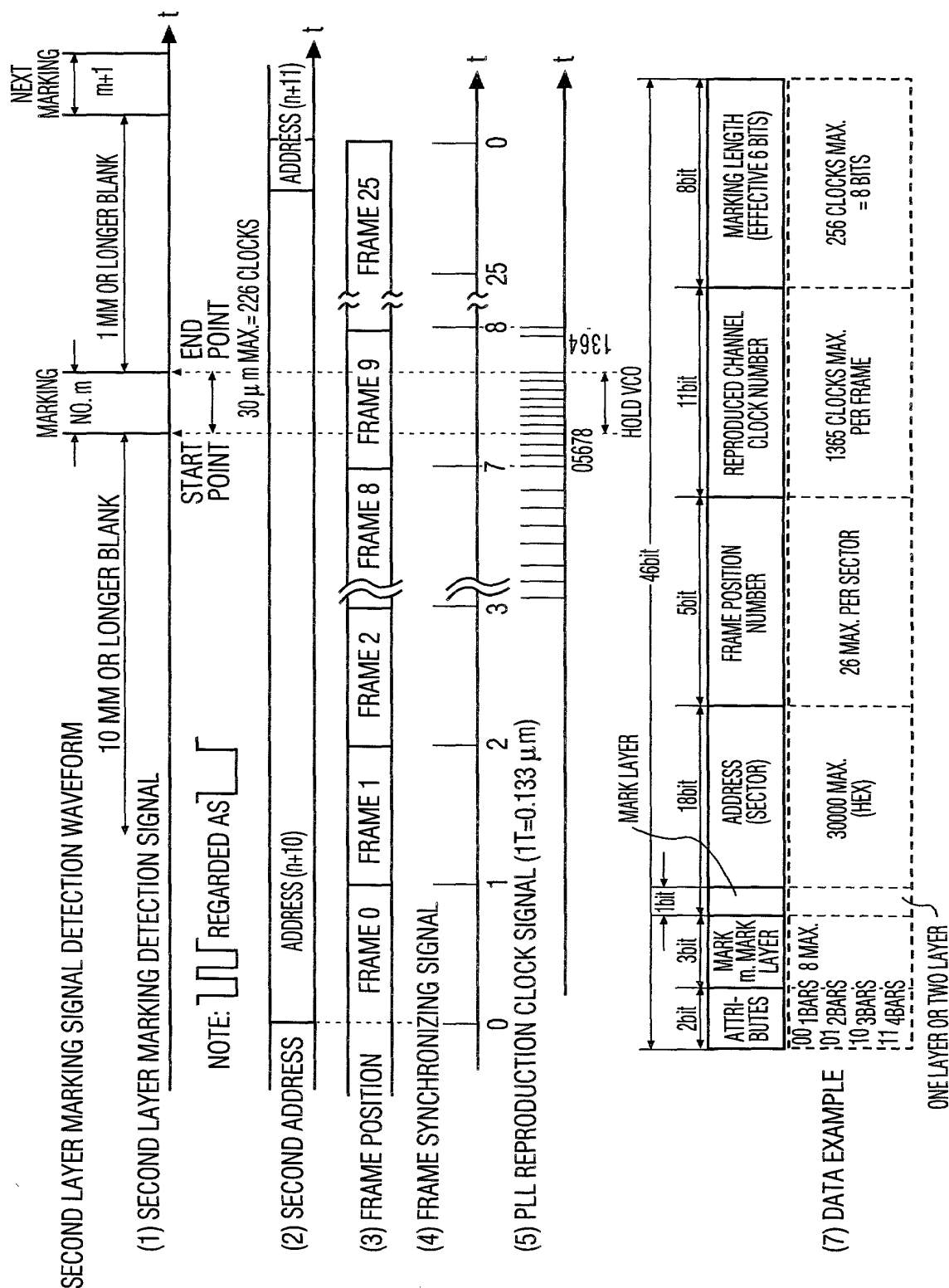


FIG. 21



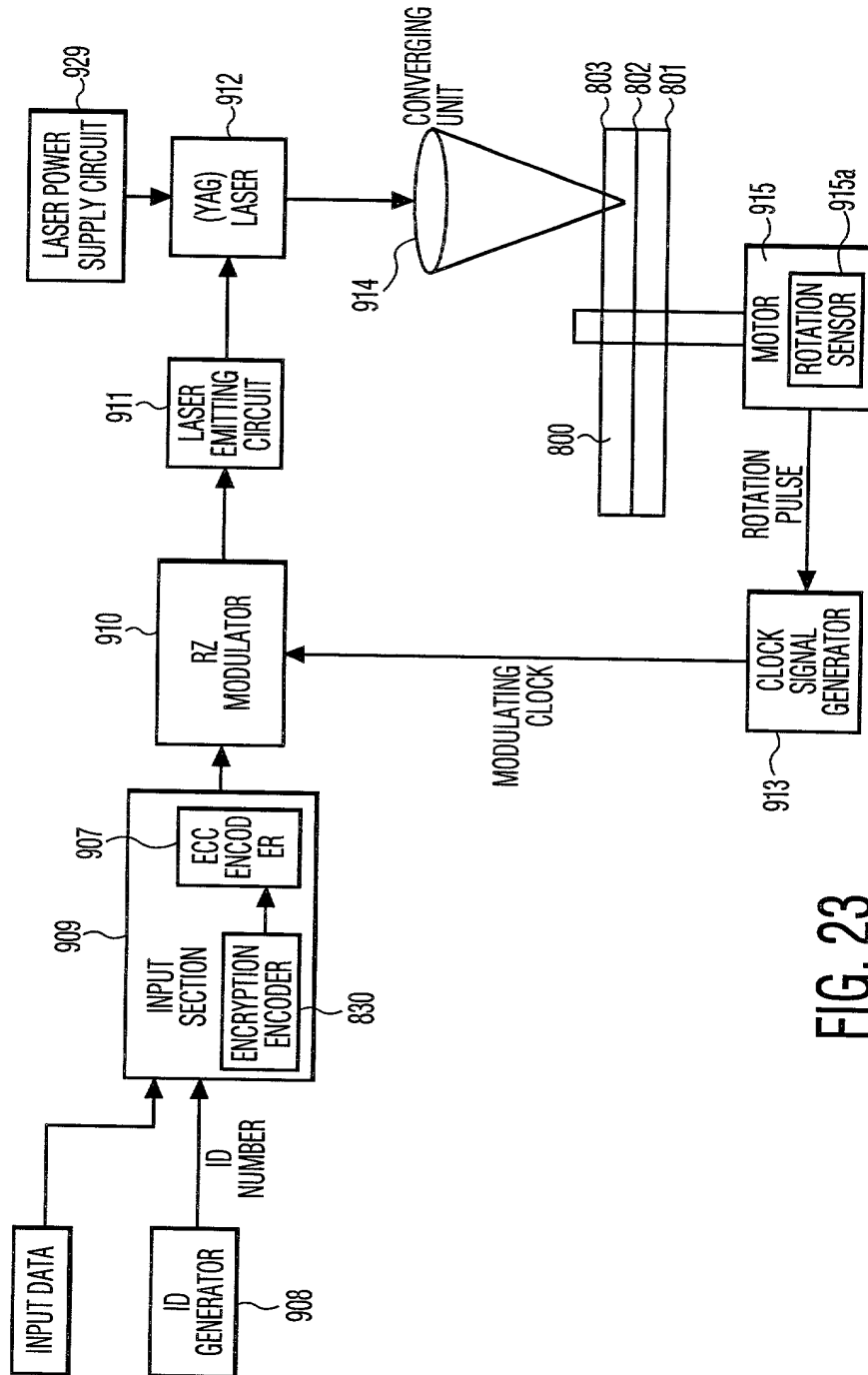


FIG. 23

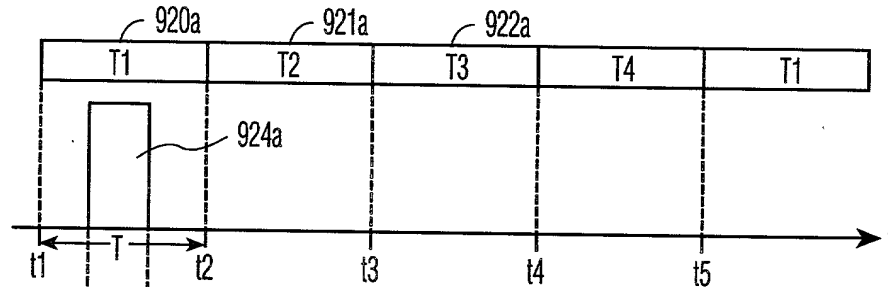
RZ RECORDING
MODULATION CLOCK
BASED ON ROTATION
PULSE

FIG. 24A

(1) RECORDED SIGNAL OF "00"



FIG. 24B



(2) TRIMMING PATTERN OF "00"

FIG. 24C

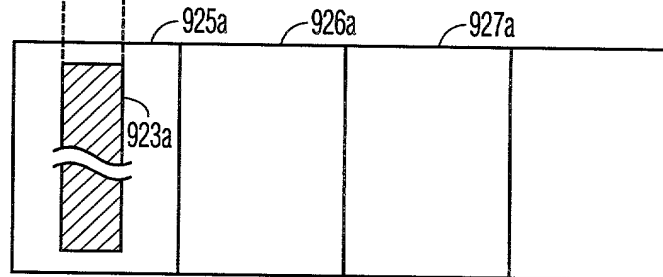
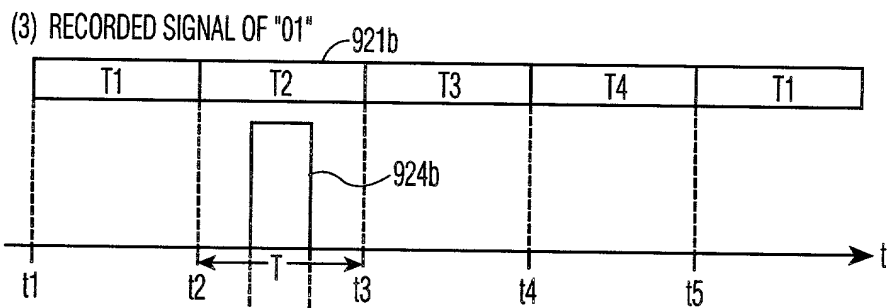
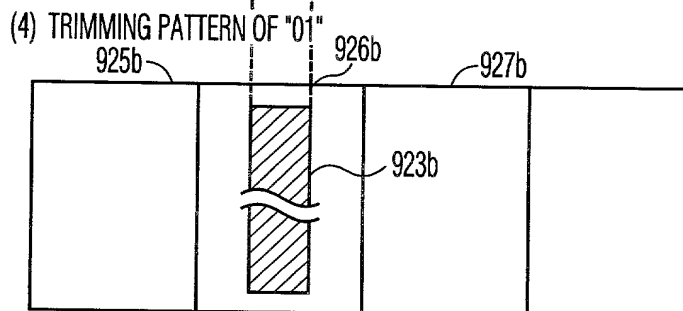


FIG. 24D



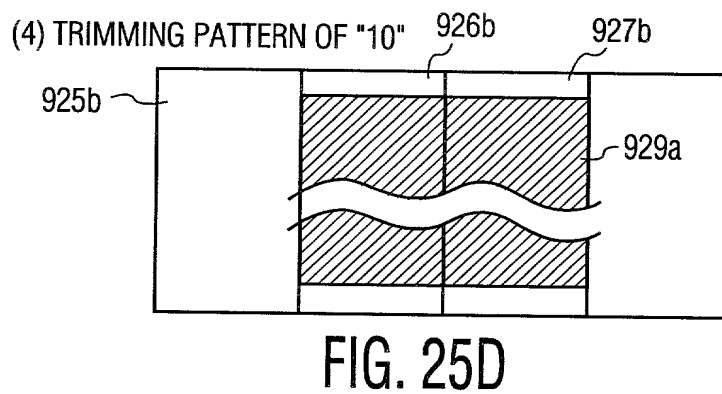
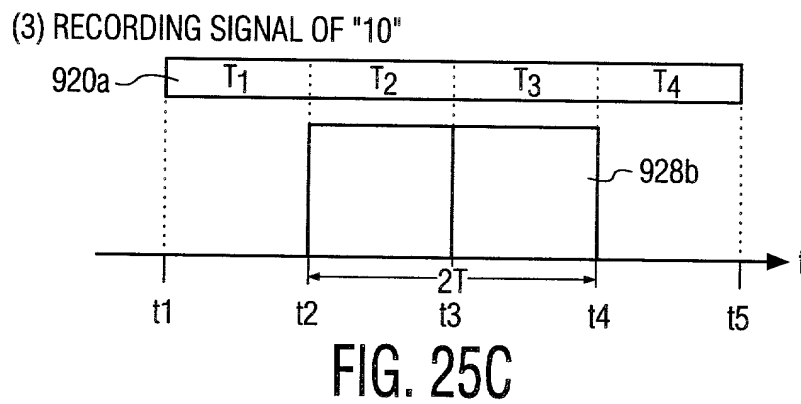
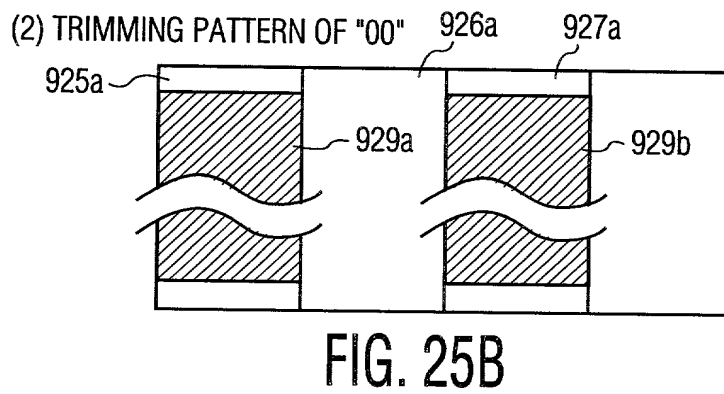
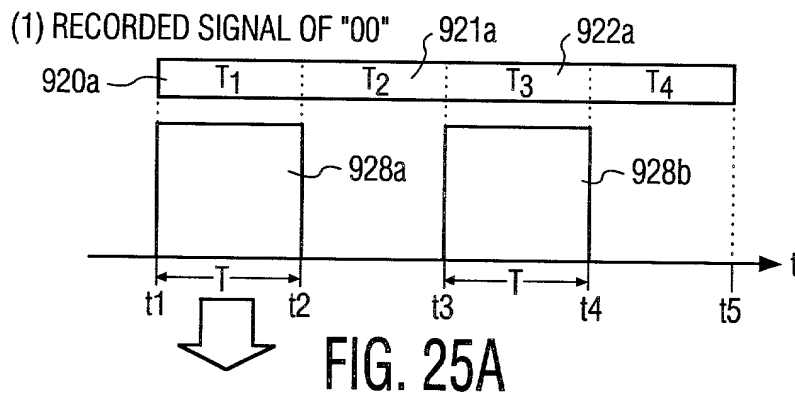
(3) RECORDED SIGNAL OF "01"

FIG. 24E

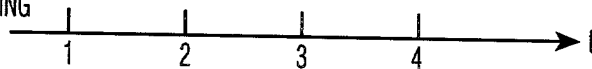


(4) TRIMMING PATTERN OF "01"

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PE-RZ RECORDING

RECORDING
CLOCK

(1) RECORDED SIGNAL OF "0"

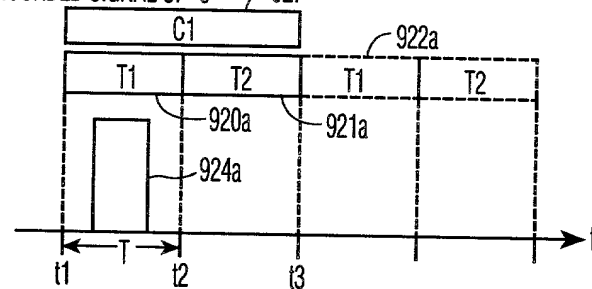


FIG. 26A

(2) TRIMMING PATTERN OF "0"

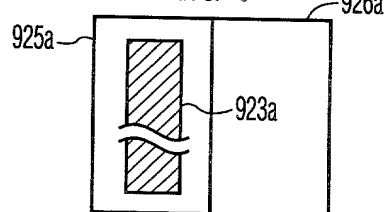


FIG. 26B

(3) RECORDED SIGNAL OF "1"

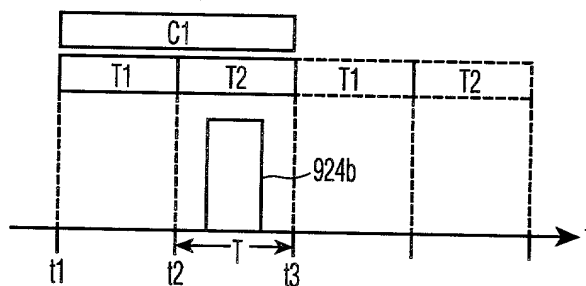


FIG. 26C

(4) TRIMMING PATTERN OF "1"

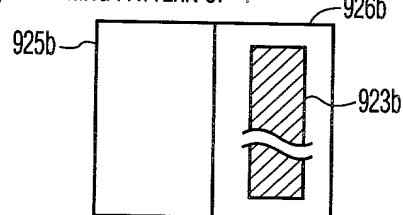


FIG. 26D

(4) RECORDED SIGNAL OF "010"

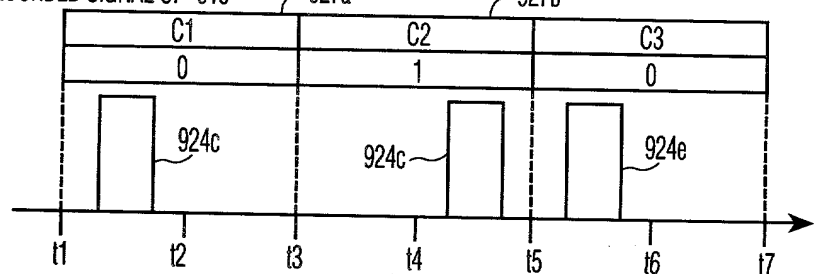


FIG. 26E

FIG. 27A

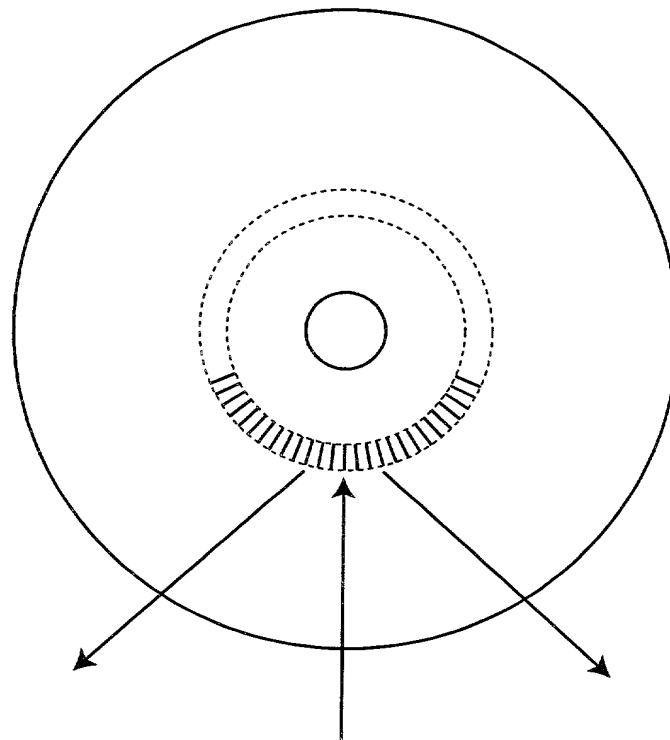
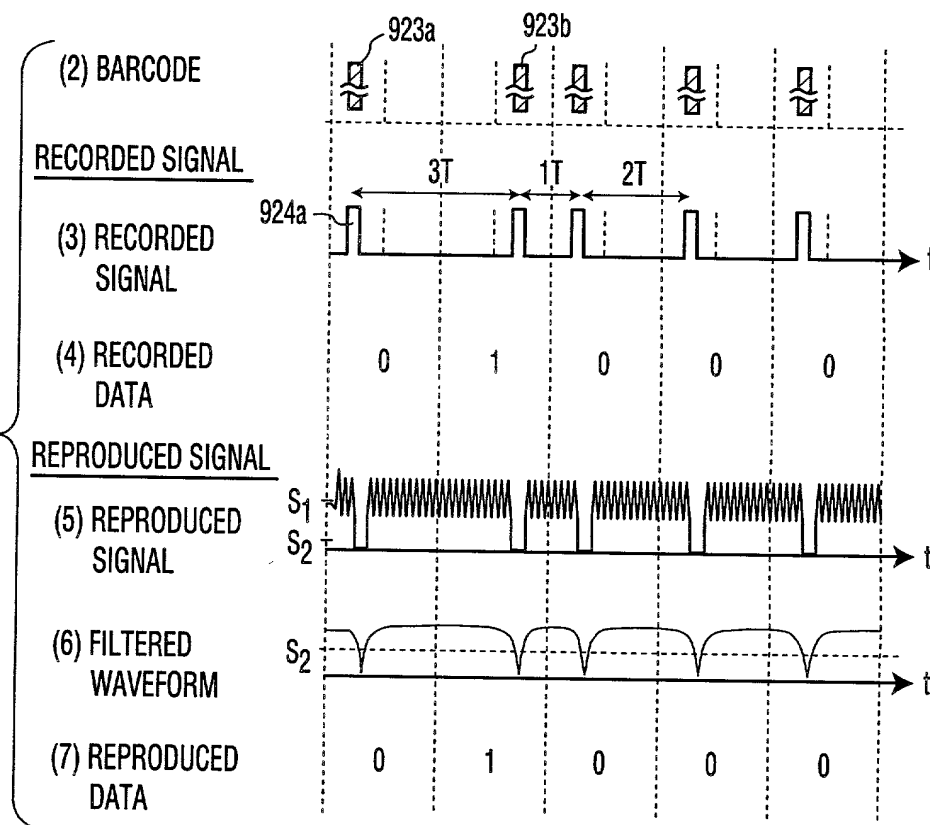
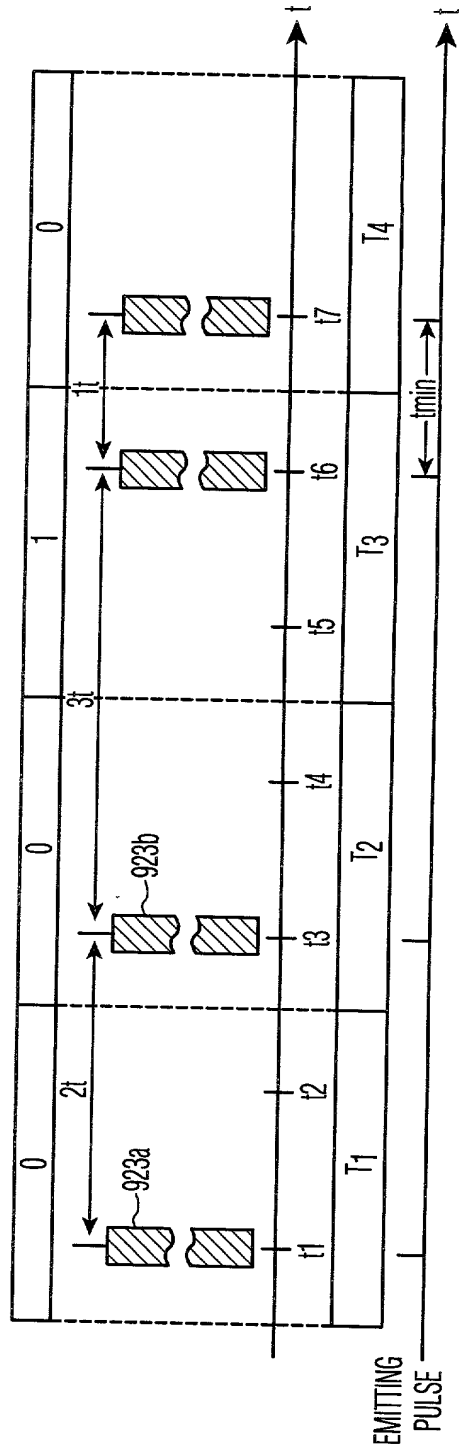
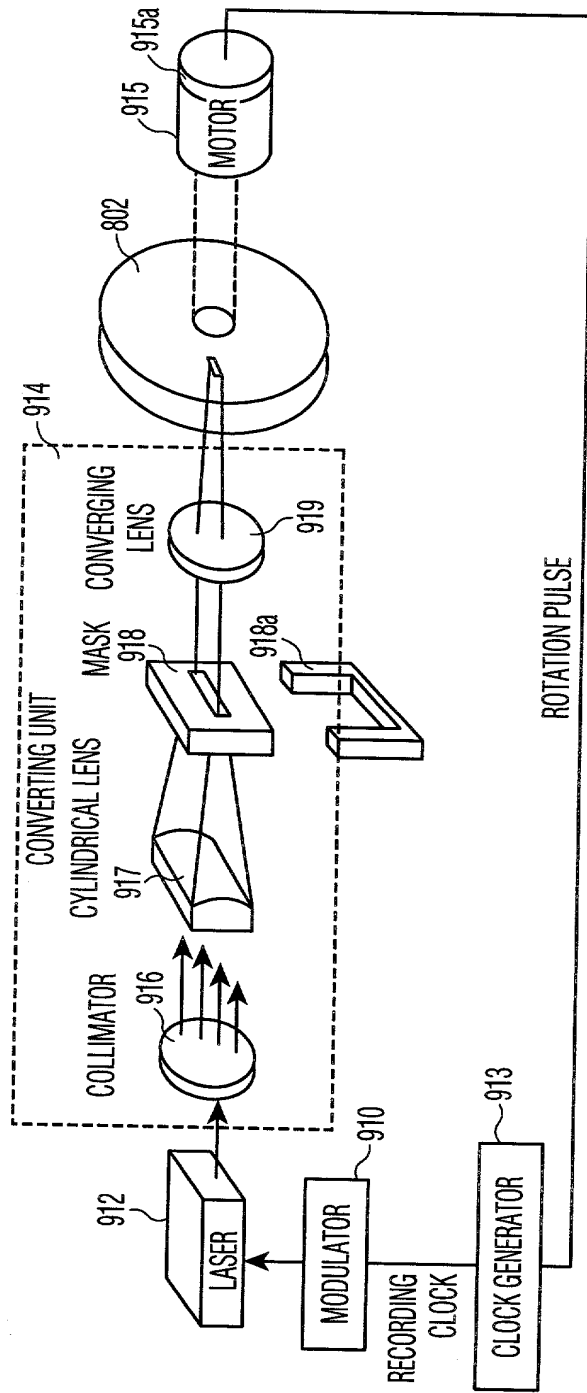
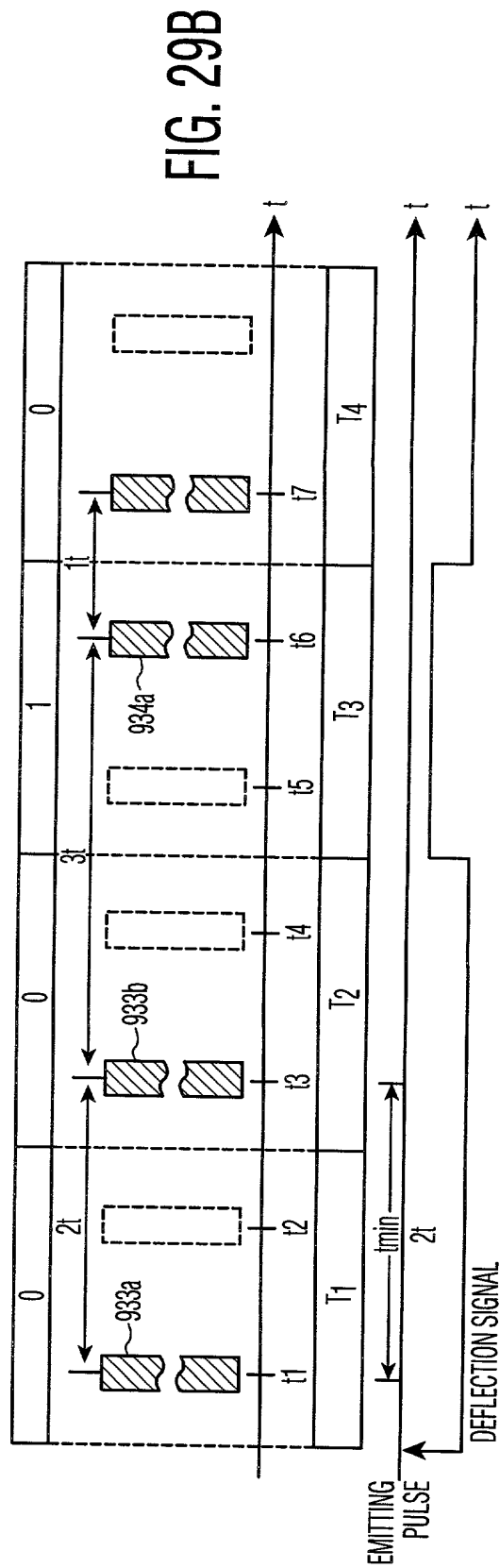
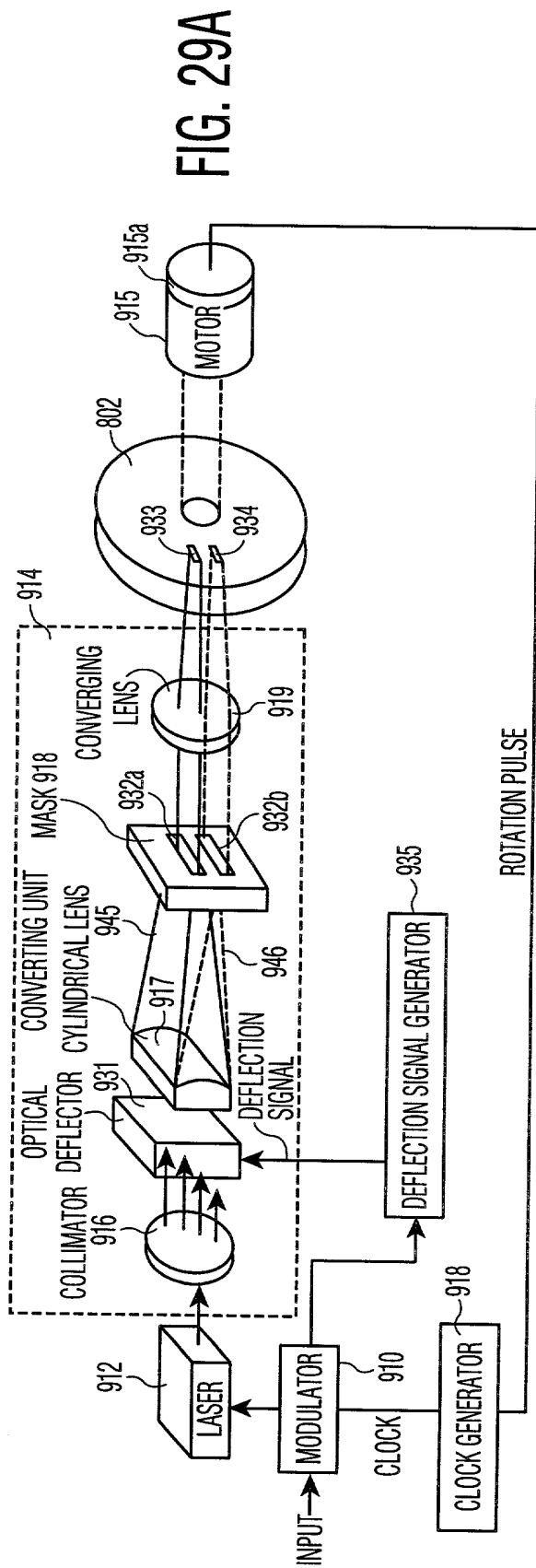


FIG. 27B







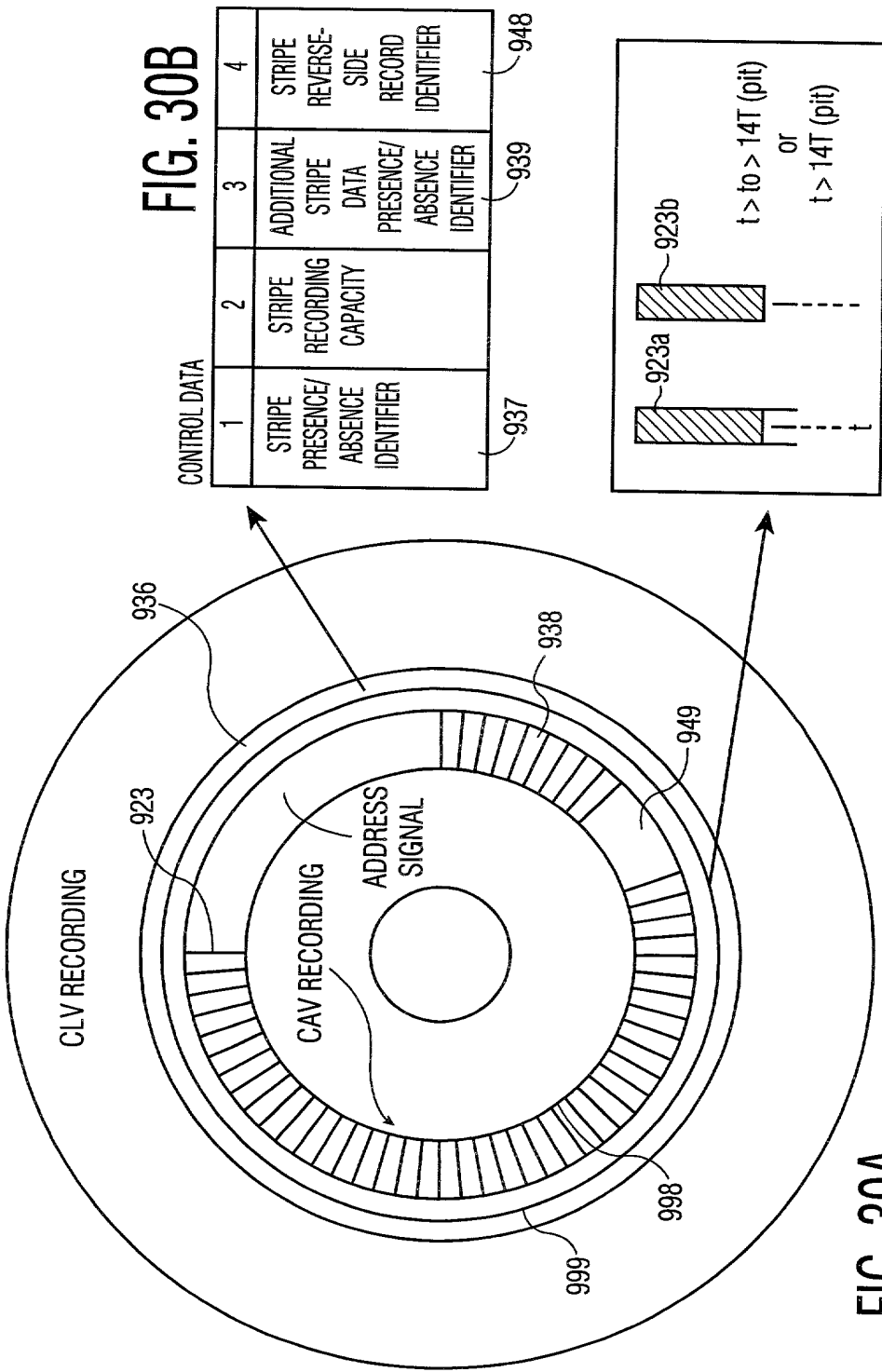


FIG. 30B

CONTROL DATA			
1	2	3	4
STRIPE PRESENCE/ ABSENCE IDENTIFIER	STRIPE RECORDING CAPACITY	ADDITIONAL STRIPE DATA PRESENCE/ ABSENCE IDENTIFIER	STRIPE REVERSE- SIDE RECORD IDENTIFIER
937		939	948

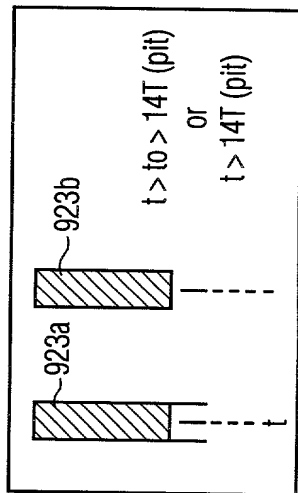


FIG. 30C

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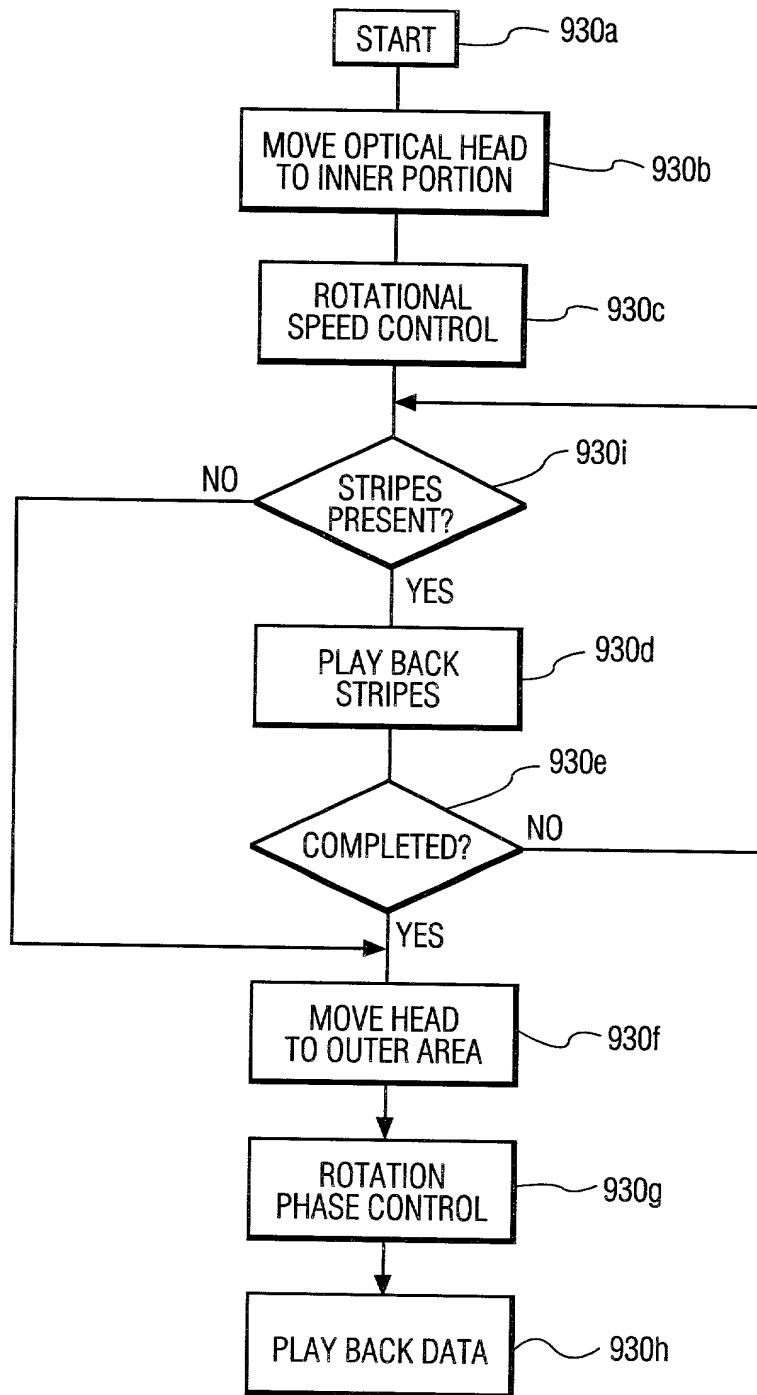


FIG. 31

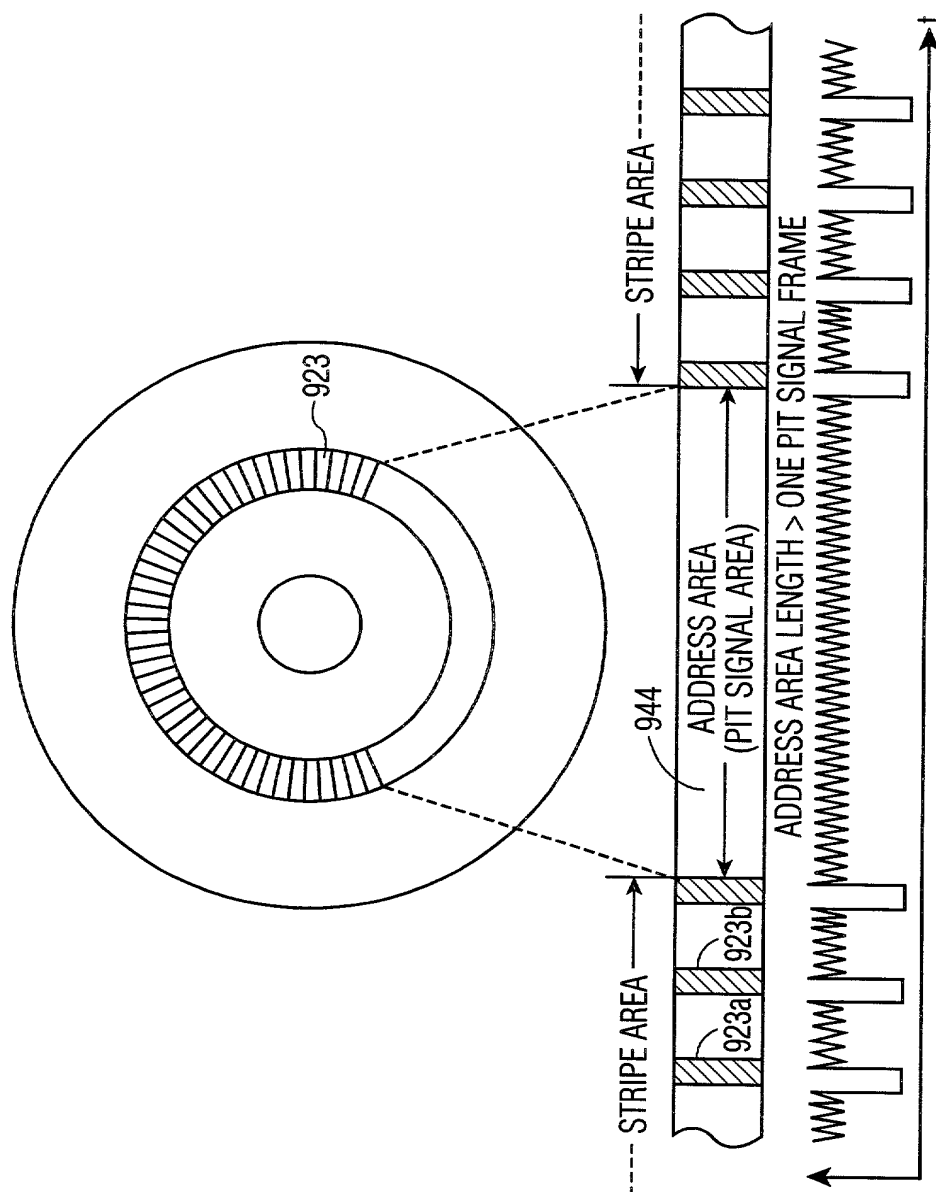


FIG. 32

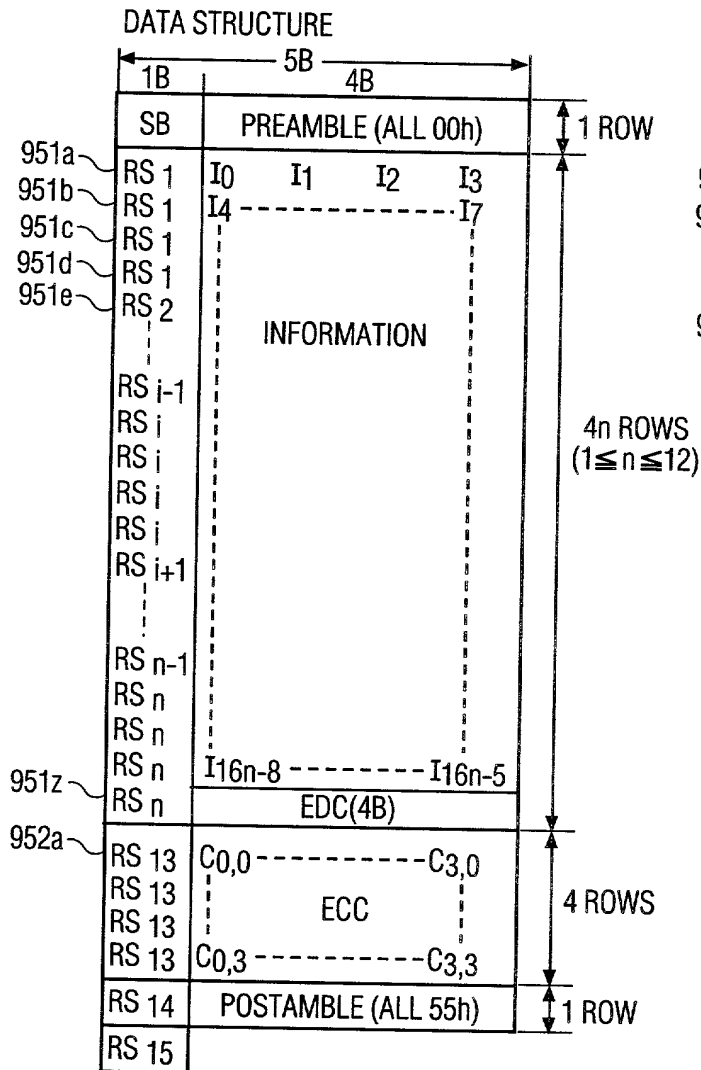


FIG. 33A

DATA STRUCTURE WHEN n=1

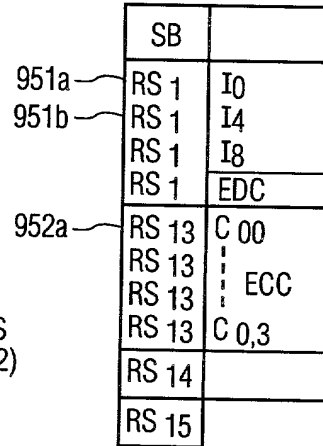


FIG. 33B

RANDOM ERROR CORRECTION CAPABILITY

BIT ERROR RATE BEFORE CORRECTION	READ ERROR RATE AFTER CORRECTION
10 ⁻⁵	1 IN 10 ¹⁰ DISKS
10 ⁻⁴	1 IN 10 ⁷ DISKS
10 ⁻³	1 IN 10 ⁴ DISKS
BURST ERROR CORRECTION CAPABILITY	

FIG. 33C

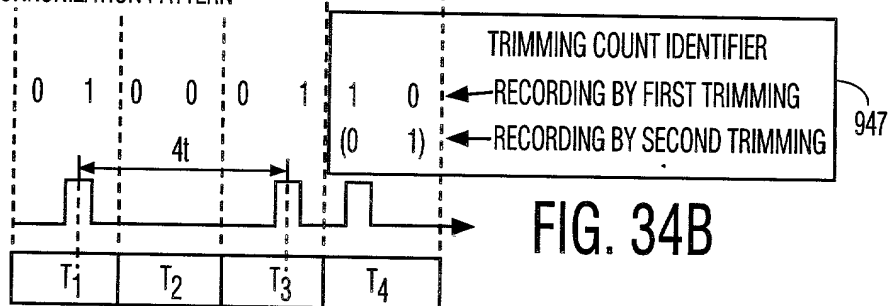
SYNCHRONIZATION CODE DATA

SYNCHRONIZATION CODE

SYNC BYTE /RESYNC	BIT PATTERN											
	FIXED PATTERN (CHANNEL BIT)								SYNC CODE (DATA BIT)			
	C ₁₅	C ₁₄	C ₁₃	C ₁₂	C ₁₁	C ₁₀	C ₉	C ₈	b ₃	b ₂	b ₁	b ₀
SB	0	1	0	0	0	1	1	0	0	0	0	0
RS ₁	0	1	0	0	0	1	1	0	0	0	0	1
RS ₂	0	1	0	0	0	1	1	0	0	0	1	0
⋮					⋮					⋮		
RS _i	0	1	0	0	0	1	1	0			i	
⋮					⋮					⋮		
RS ₁₅	0	1	0	0	0	1	1	0	1	1	1	1

FIG. 34A

FIXED SYNCHRONIZATION PATTERN



MAXIMUM CAPACITY

	RECORDING CAPACITY	TOTAL BYTE COUNT	EFFICIENCY	RECORDING AREA ANGLE	UNRECORDED AREA ANGLE
MINIMUM	12B	41B	29.3%	51 DEGREES	309 DEGREES
MAXIMUM	188B	271B	69.4%	336 DEGREES	24 DEGREES

FIG. 34C

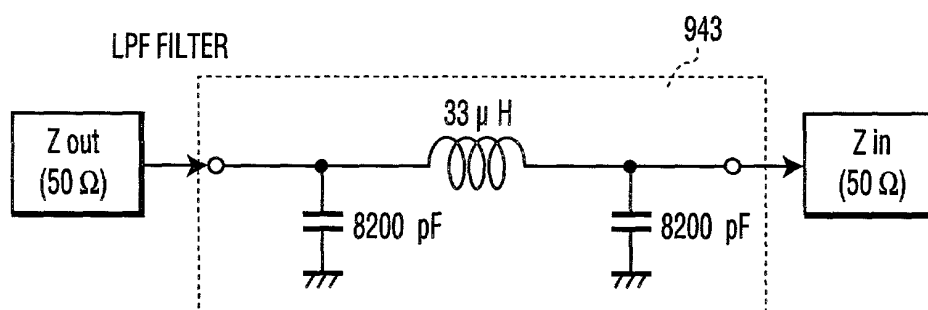


FIG. 35A

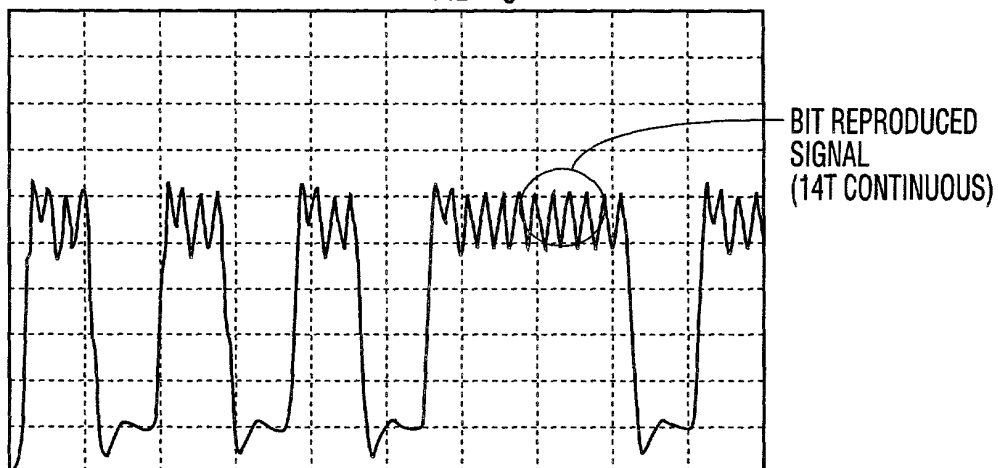
SIMULATOR WAVEFORM AFTER LPF : $I_{14L} = I_S = 0.1$ 

FIG. 35B

FIG. 36A

DIMENSIONAL ACCURACY OF SLIT (AT $r=22.2\text{mm}$)

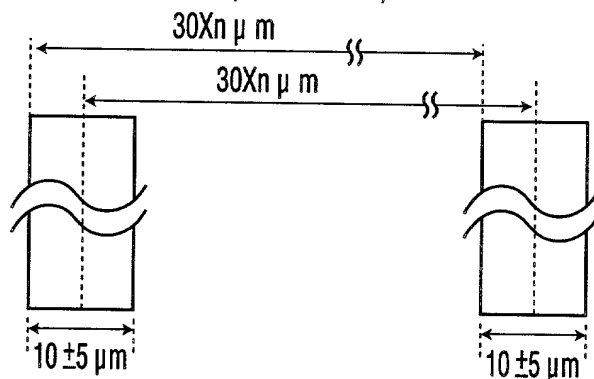


FIG. 36B

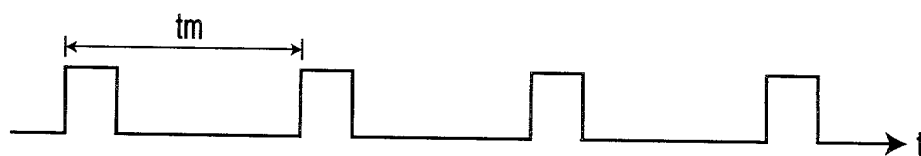


FIG. 36C

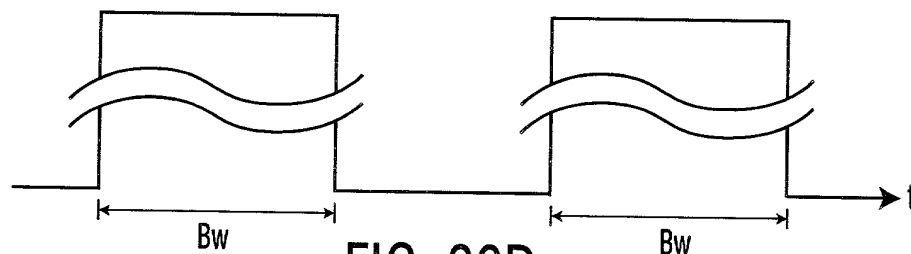


FIG. 36D

(1) TIME SLOT

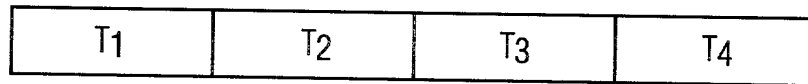


FIG. 37A

(2) CHANNEL BIT

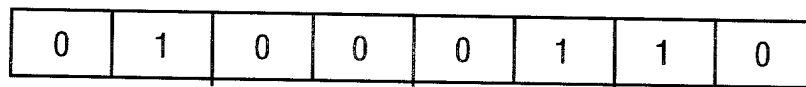


FIG. 37B

(3) RECORDING PULSE

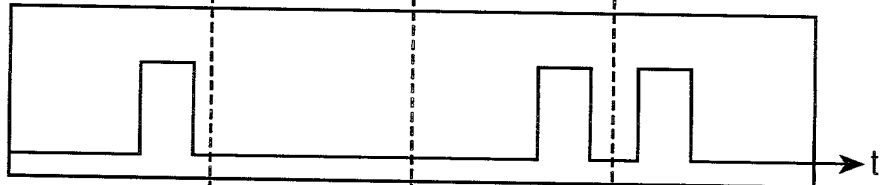


FIG. 37C

(4) EMITTING PULSE

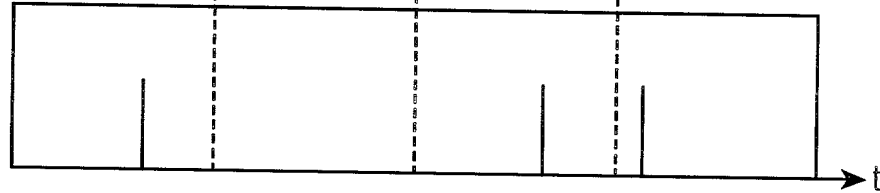


FIG. 37D

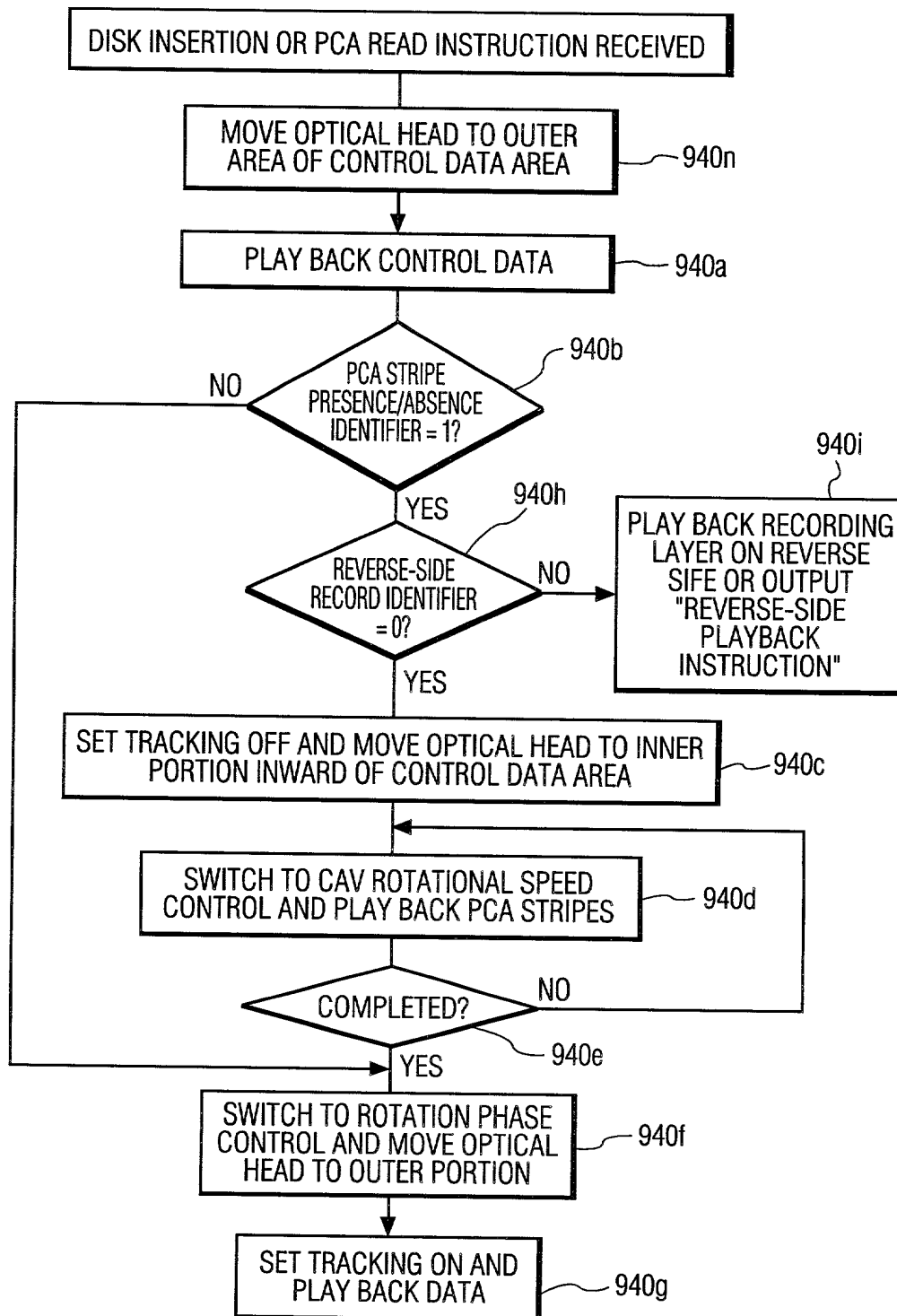


FIG. 38

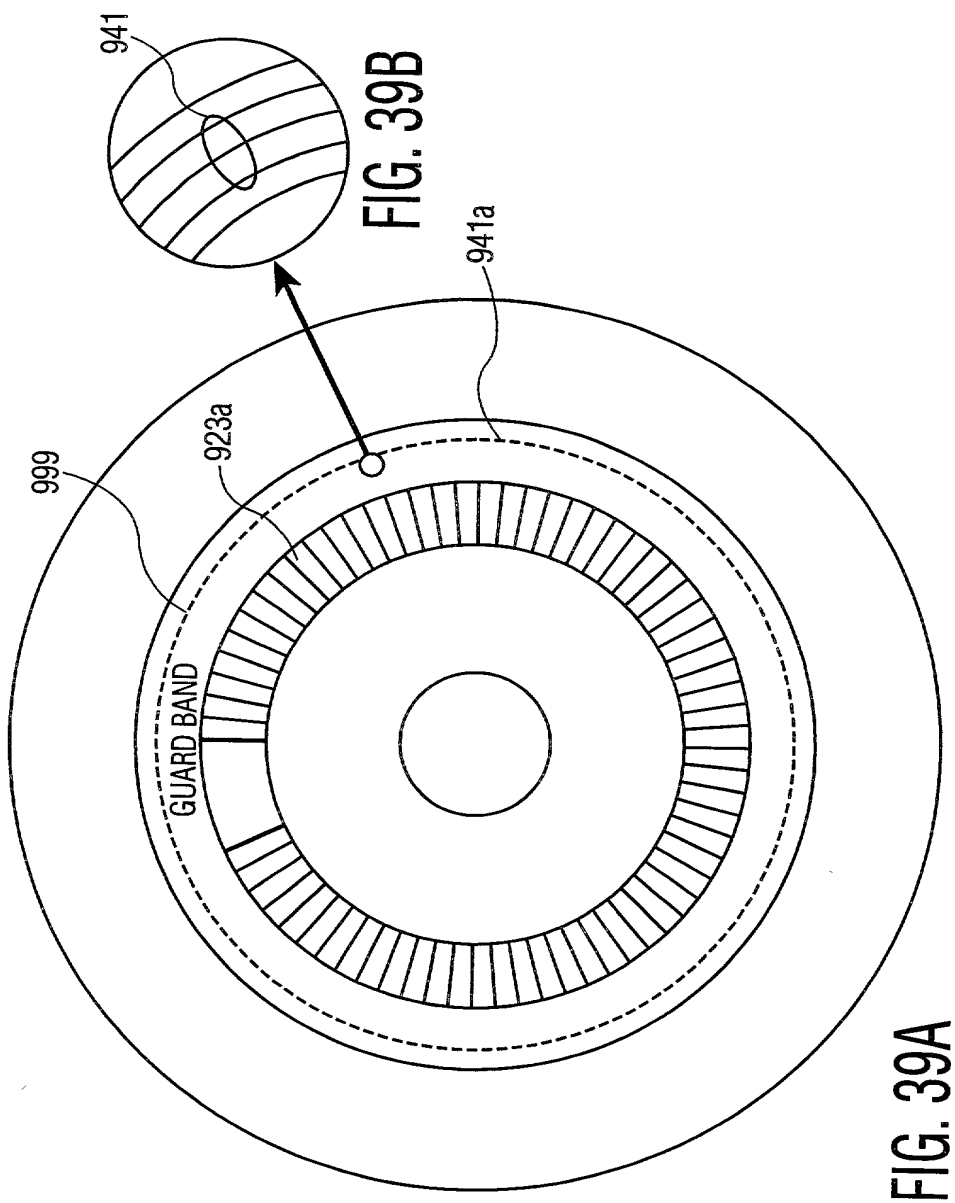
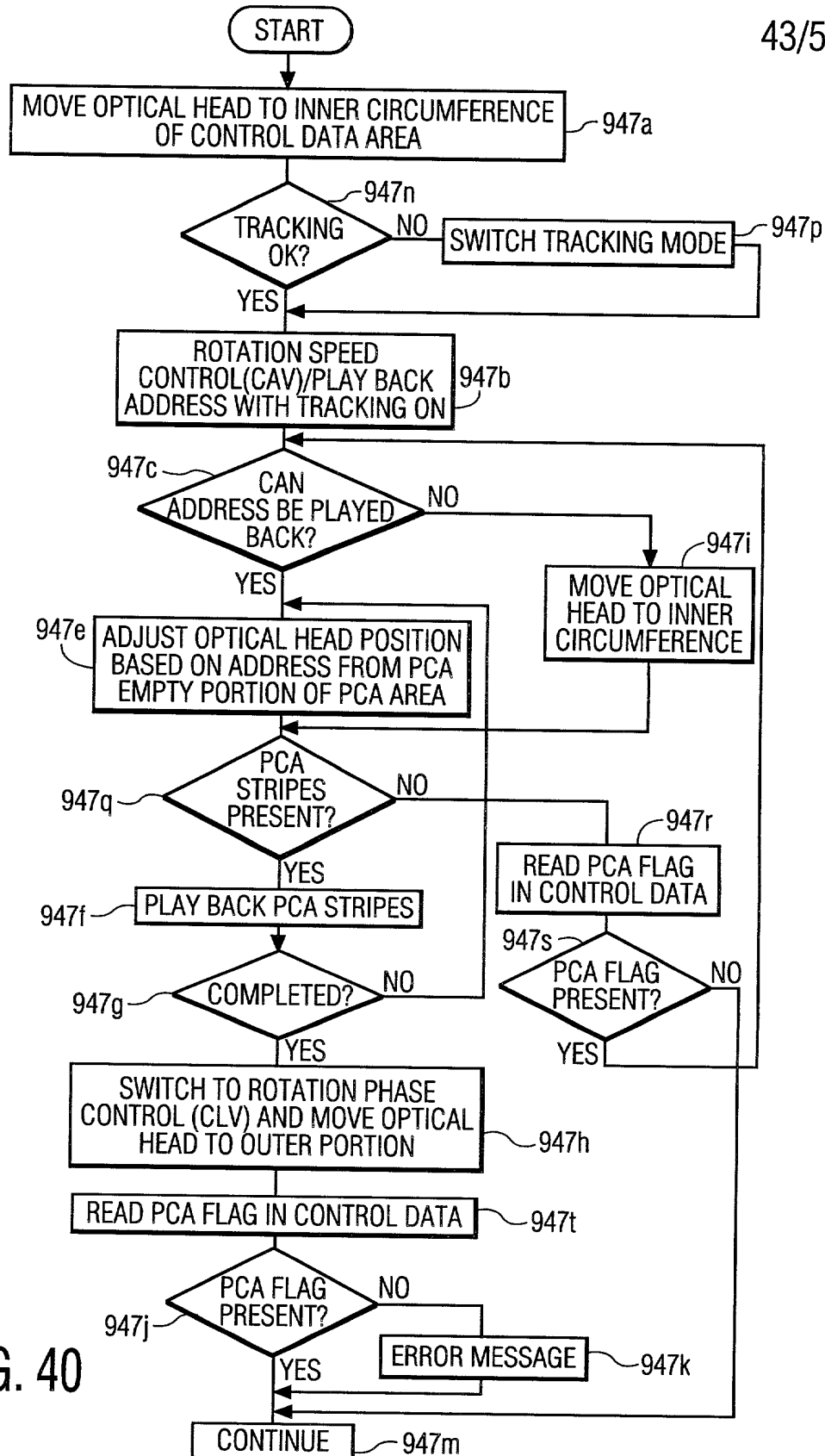


FIG. 39A

FIG. 39B



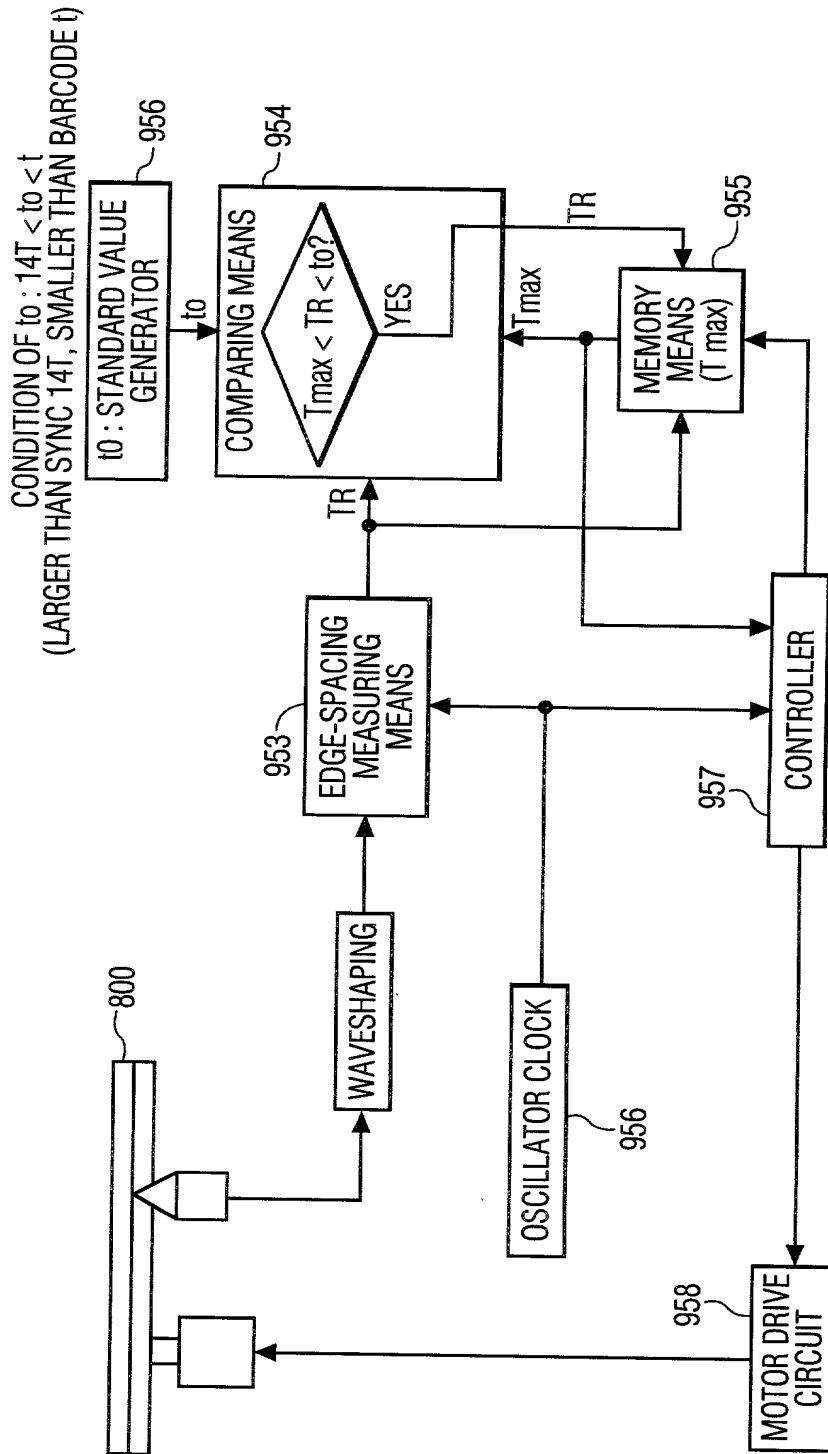


FIG. 41

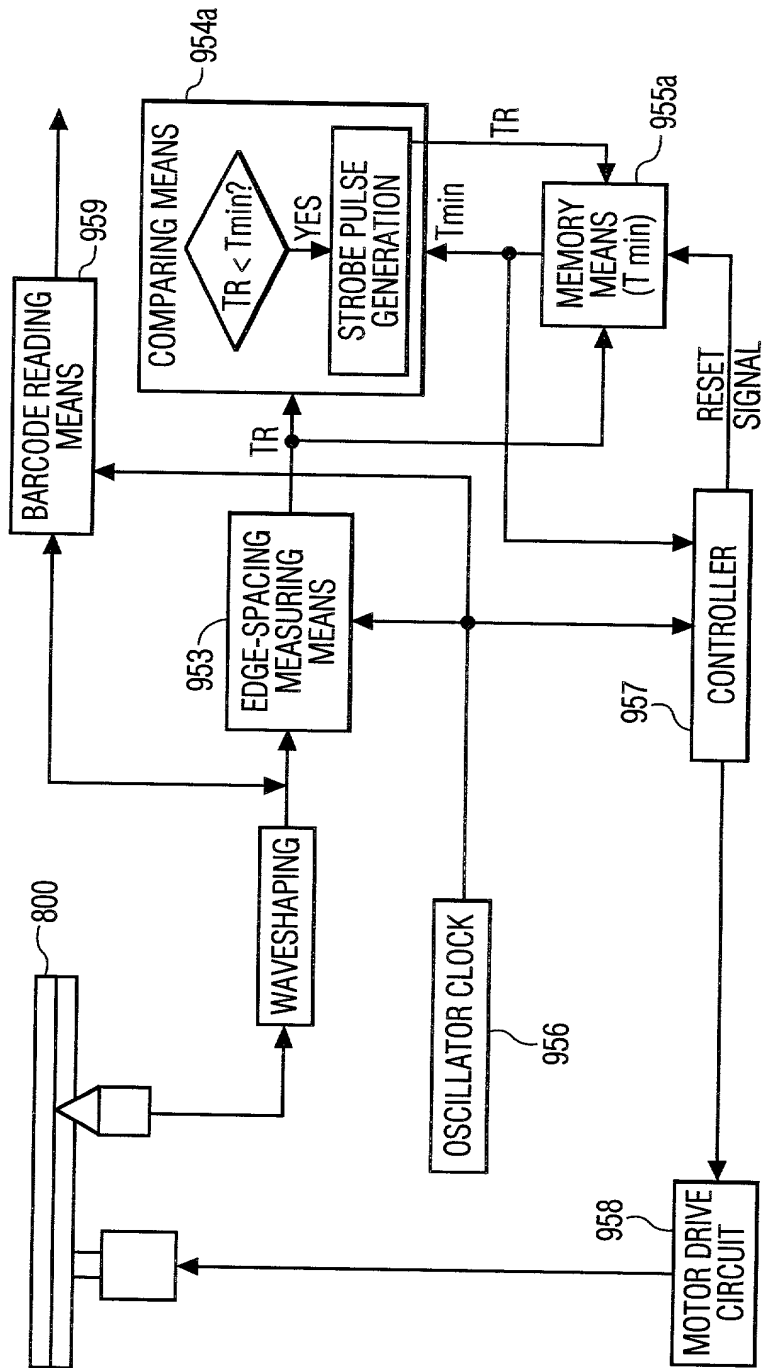


FIG. 42

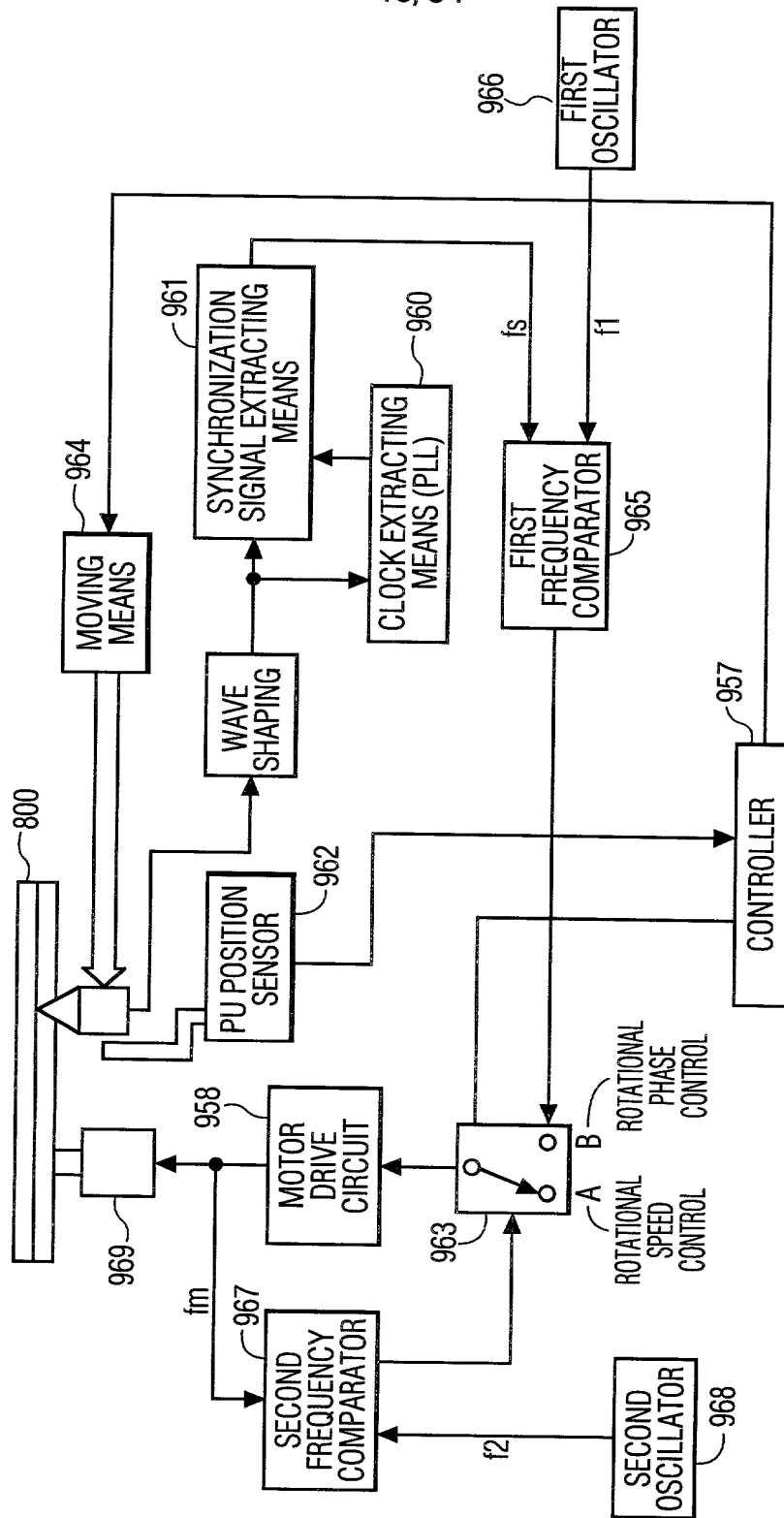


FIG. 43

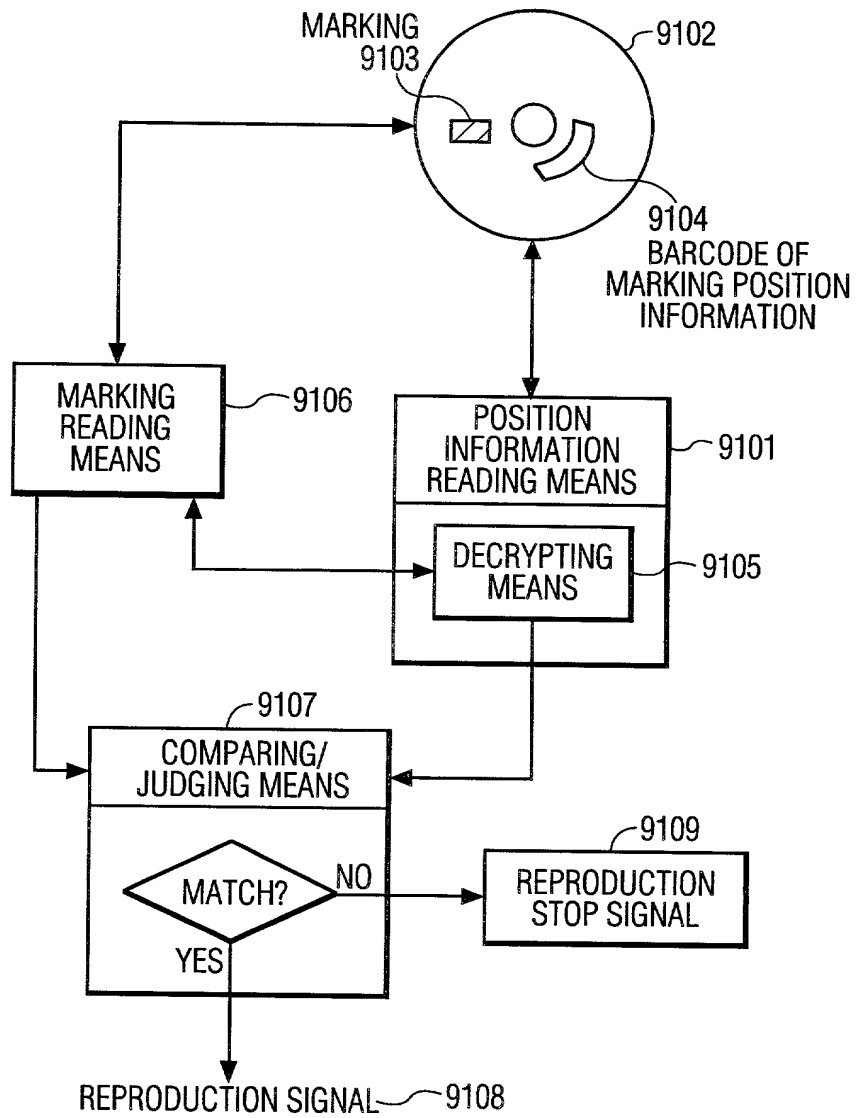
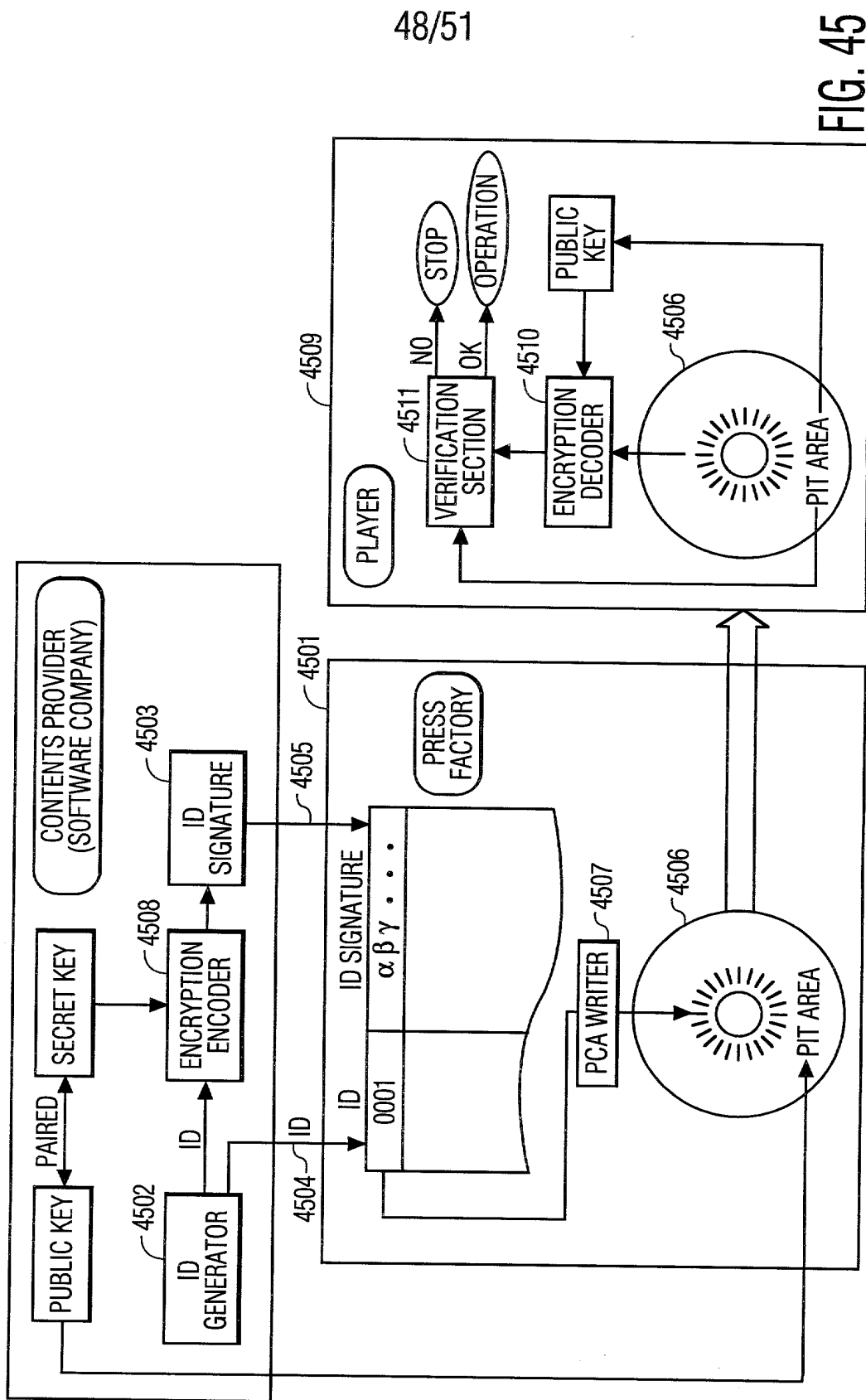
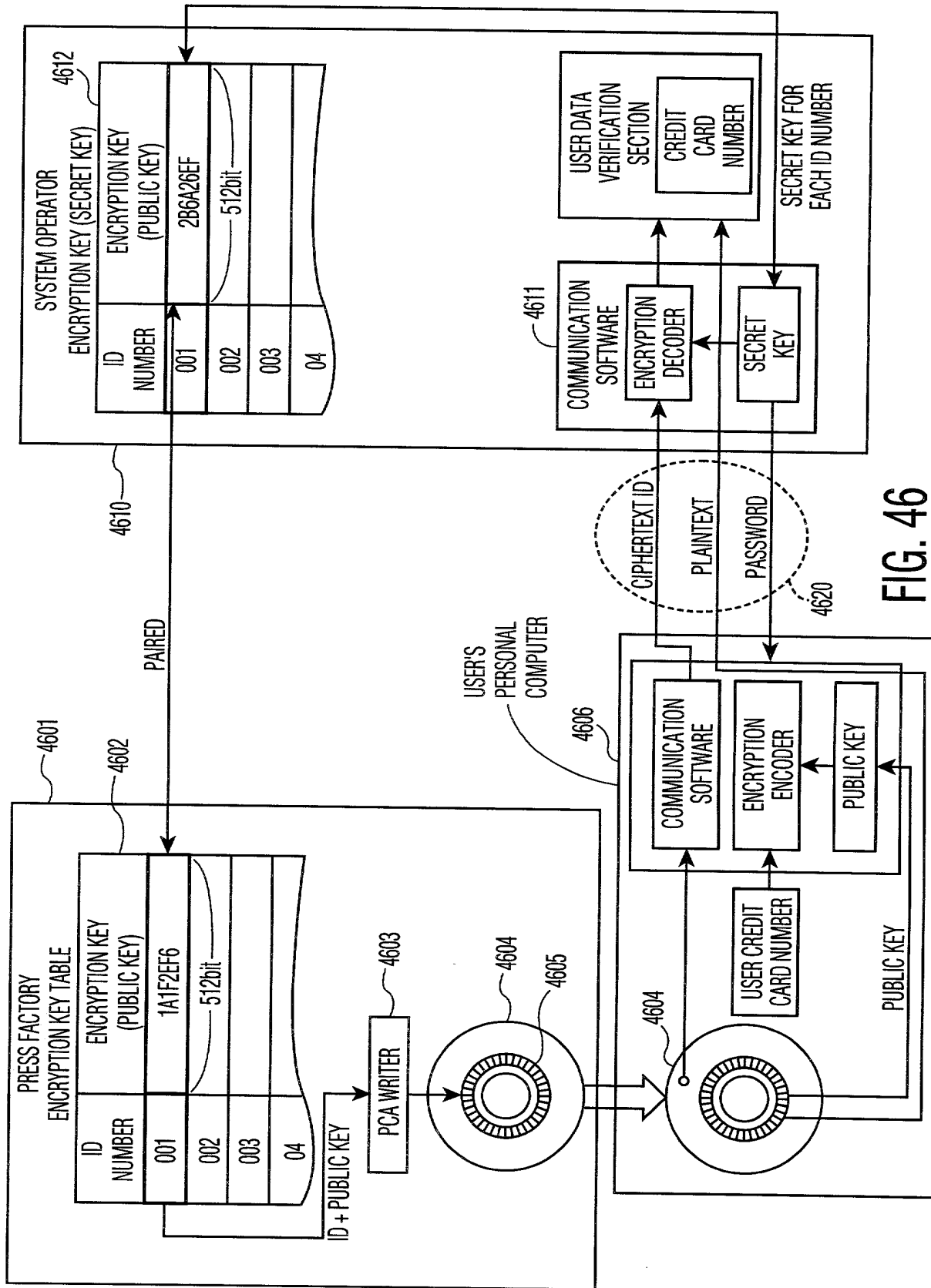


FIG. 44





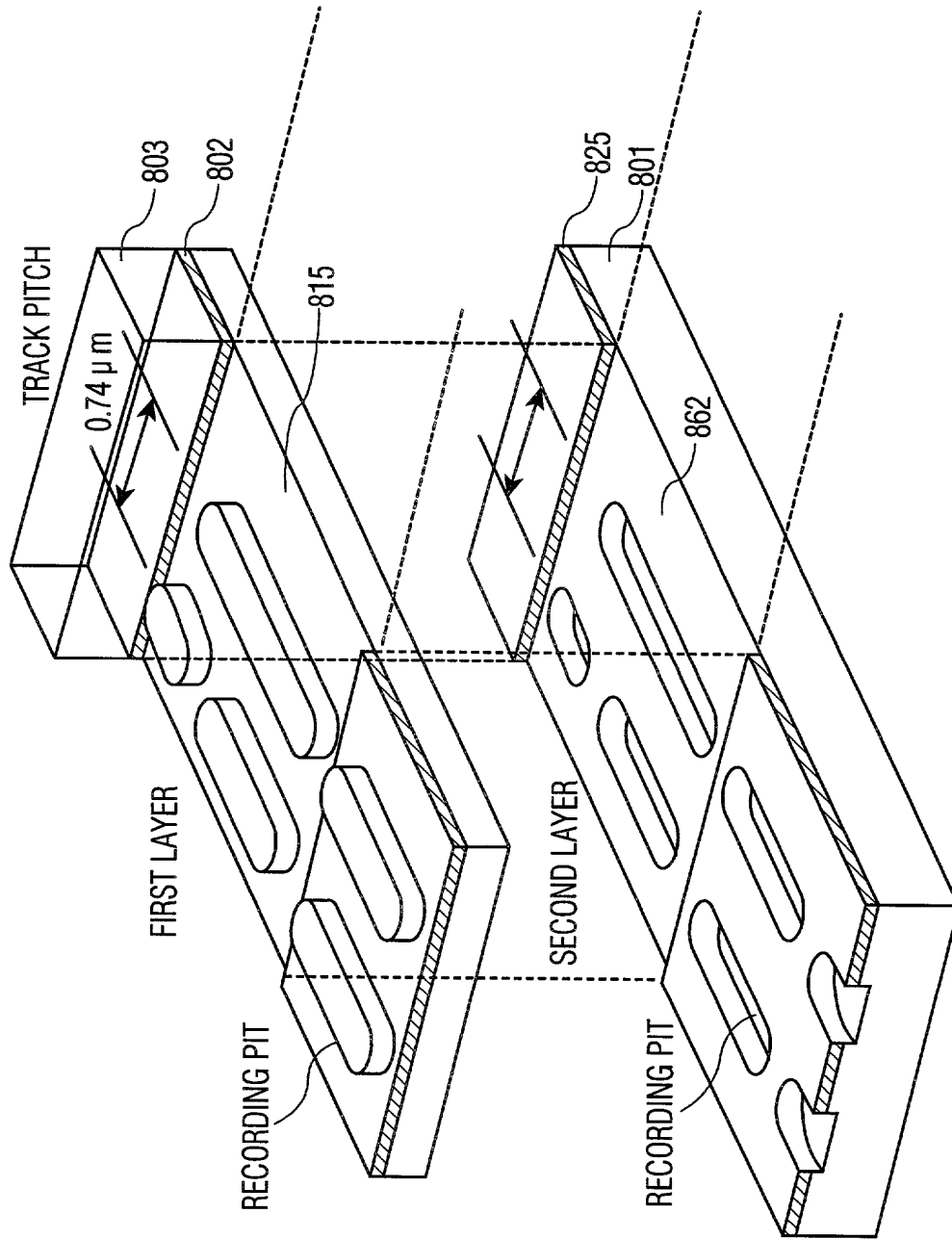


FIG. 47

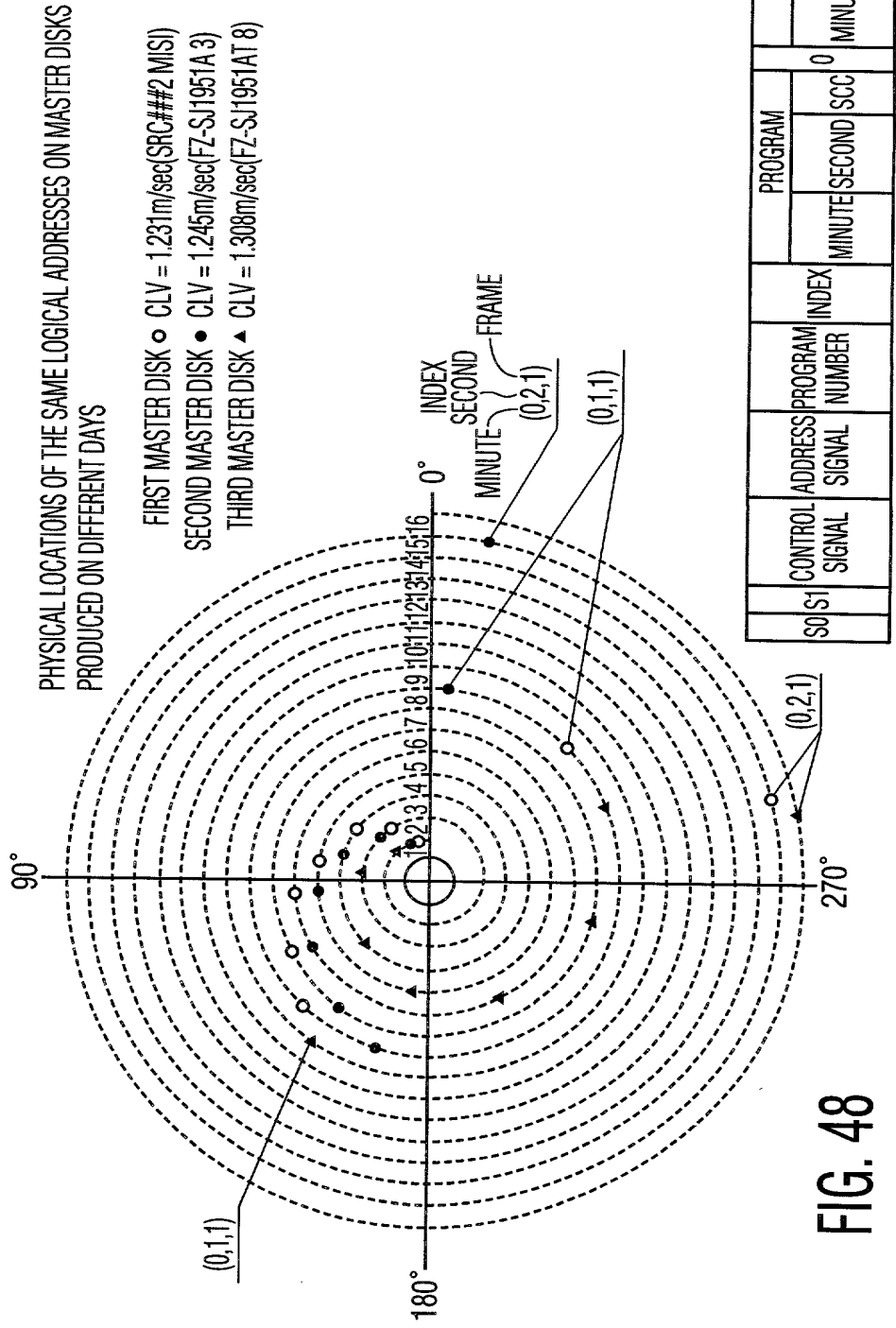


FIG. 48